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May 7, 1996

PUB-NO: JP408113784A

DOCUMENT-IDENTIFIER: JP 08113784 A

TITLE: IMPROVER FOR LIQUID CRYSTAL CHARACTERISTIC

PUBN-DATE: May 7, 1996

## INVENTOR-INFORMATION:

NAME

COUNTRY

OKABE, NOBUHIRO

HASHIMOTO, SHIGEJI

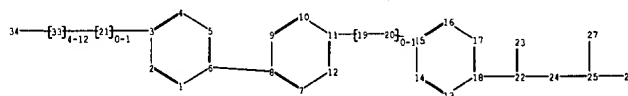
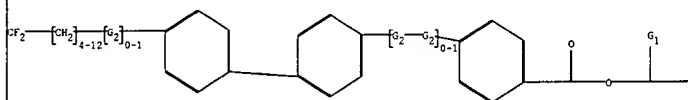
INT-CL (IPC): C09 K 19/54; G02 F 1/13; G02 F 1/137

## ABSTRACT:

PURPOSE: To obtain an improver for liquid crystal characteristics, comprising a compound having a specific structure, capable of remarkably improving the memory margin of an antiferroelectric liquid crystal composition and sufficiently usable for a display.

CONSTITUTION: This improver comprises a compound of formula I [(m) is an integer of 4-14; (n) is an integer of 0-13; X is a single bond, O, COO or OCO; (r) is 1 or 2; (p) is an integer of 2-12; Z is CH<sub>3</sub> or CF<sub>3</sub>]. For example, a compound of formula II is cited as the compound of formula I. Furthermore, the improver is preferably added in an amount of 0.1-40wt.%, preferably 1-20wt.% based on a liquid crystal composition, especially an antiferroelectric liquid crystal composition.

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chain nodes :

19 20 21 22 23 24 25 27 28 33 34

ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

chain bonds :

3-21 6-8 11-19 15-20 18-22 19-20 21-33 22-23 22-24 24-25 25-27 25-28 33-34

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12 13-14 13-18 14-15  
15-16 16-17 17-18

exact/norm bonds :

3-21 11-19 15-20 19-20 21-33 22-23 22-24 24-25 25-27

exact bonds :

6-8 18-22 25-28 33-34

normalized bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12 13-14 13-18 14-15  
15-16 16-17 17-18

G1:CH3,Et,n-Pr,CF3

G2:C,O

Match level :

1:Atom 2:Atom 3:Atom 4:Atom 5:Atom 6:Atom 7:Atom 8:Atom 9:Atom 10:Atom 11:Atom  
12:Atom 13:Atom 14:Atom 15:Atom 16:Atom 17:Atom 18:Atom 19:CLASS 20:CLASS  
21:CLASS 22:CLASS 23:CLASS 24:CLASS 25:CLASS 27:CLASS 28:CLASS 33:CLASS 34:CLASS

AN 2001:305417 CAPLUS  
DN 135:84565  
TI Unusual Thickness-Dependent Thermal Behavior and Anticlinic Coupling in  
Chiral Smectic Free-Standing Liquid-Crystal Films  
AU Chao, C. Y.; Lo, C. R.; Wu, P. J.; Liu, Y. H.; Link, D. R.; MacLennan, J.  
E.; Clark, N. A.; Veum, M.; Huang, C. C.; Ho, J. T.  
CS Department of Physics and Astronomy, National Central University,  
Chung-Li, 32054, Taiwan  
SO Physical Review Letters (2001

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SWITCHAB.DWPI,TDBD,EPAB,JPAB,USPT.	2
SWITCHABE.DWPI,TDBD,EPAB,JPAB,USPT.	2
SWITCHABILITY.DWPI,TDBD,EPAB,JPAB,USPT.	235
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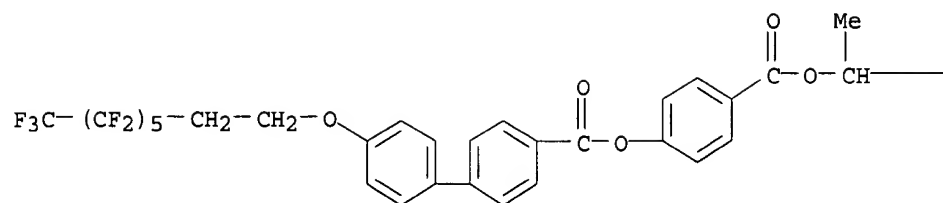
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<u>L4</u>	L1 and room	1	<u>L4</u>
<u>L3</u>	L1 and viscosity	1	<u>L3</u>
<u>L2</u>	l1 and smectic A	1	<u>L2</u>
<u>L1</u>	us-5110497-\$.did.	2	<u>L1</u>

END OF SEARCH HISTORY

AN 1998:624749 CAPLUS  
 DN 130:19089  
 TI Antiferroelectric liquid crystals with fluorinated parts of terminal chains. I. Synthesis of liquid crystalline compounds and their intermediates  
 AU Drzewinski, Witold; Dabrowski, Roman; Czyprynski, Krzysztof; Neubert, Mary  
 CS Instytut Chemii WAT, Warsaw, 01-489, Pol.  
 SO Biuletyn Wojskowej Akademii Technicznej (1998), 47(7-8), 53-68  
 CODEN: BWATFP; ISSN: 1234-5865  
 PB Wojskowa Akademia Techniczna  
 DT Journal  
 LA Polish  
 CC 75-11 (Crystallography and Liquid Crystals)  
 AB The method of prepg. the optically active hydroxyesters:  
 1-hydroxy-4-(octyl-2-oxycarbonyl)benzene, 4-hydroxy-4'-(octyl-2-oxycarbonyl)biphenyl, 4-(octyl-2-oxycarbonyl)-Ph 4'-hydroxybiphenyl-4-carboxylate and 4'-(octyl-2-oxycarbonyl)biphenyl-4-yl 4-hydroxybenzoate, has been elaborated. These intermediates were used for the synthesis of liq. cryst. homologous series of di- and triesters exhibiting the presence of tilted phases CA\* and C\*. b  
 ST antiferroelec liq crystal fluorinated prepn  
 IT Liquid crystals  
 (antiferroelec.; prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Antiferroelectric materials  
 (liq.-crystal; prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Liquid crystals  
 (transitions; prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 111153-16-3P 215929-81-0P 215929-82-1P 215929-89-8P 215929-90-1P 215929-92-3P  
 RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 205435-20-7P **215929-80-9P** 215929-83-2P 215929-84-3P 215929-85-4P 215929-86-5P 215929-87-6P 215929-88-7P 215929-91-2P 215929-93-4P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 622-08-2, 2-Benzyloxyethanol 647-42-7 1486-51-7, 4-Benzyloxybenzoic acid 4799-68-2, 3-Benzyloxypropan-1-ol 6169-06-8, (S)-(+)-2-Octanol 50670-76-3 58574-03-1, 4'-Hydroxybiphenyl-4-carboxylic acid 111153-19-6  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 110-80-5P, 2-Ethoxyethanol 111-35-3P, 3-Ethoxypropan-1-ol 10215-33-5P, 3-Butoxypropan-1-ol 61911-33-9P 111153-18-5P 111153-20-9P 111153-21-0P 205584-35-6P 215929-94-5P 215929-95-6P 215929-96-7P 215929-97-8P 215929-98-9P 215929-99-0P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT **215929-80-9P**  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (prepn. and properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 RN 215929-80-9 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4'-[[1-methylheptyl)oxy]carbonyl]phenyl ester

(9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 1-B

$-(\text{CH}_2)_5-\text{Me}$

AN 2001:305417 CAPLUS  
 DN 135:84565  
 TI Unusual Thickness-Dependent Thermal Behavior and Anticlinic Coupling in Chiral Smectic Free-Standing Liquid-Crystal Films  
 AU Chao, C. Y.; Lo, C. R.; Wu, P. J.; Liu, Y. H.; Link, D. R.; MacLennan, J. E.; Clark, N. A.; Veum, M.; Huang, C. C.; Ho, J. T.  
 CS Department of Physics and Astronomy, National Central University, Chung-Li, 32054, Taiwan  
 SO Physical Review Letters (2001), 86(18), 4048-4051  
 CODEN: PRLTAO; ISSN: 0031-9007  
 PB American Physical Society  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 69, 76  
 AB A series of discrete transitions in the relative orientation of the tilt of the interior and surface layers was obsd. in free-standing films of a chiral smectic liq. crystal. These transitions include a remarkable reentrant synclinic-anticlinic-synclinic ordering sequence of the film surfaces in the presence of an elec. field upon cooling. The profiles of the assocd. heat-capacity anomalies are found to be strongly thickness dependent and exhibit a novel crossover behavior in reduced dimensions. The anticlinic coupling between tilted surface layers in the smectic-A phase were measured.  
 ST smectic liq crystal orientation tilt transition  
 IT Liquid crystals  
 (smectic; unusual thickness-dependent thermal behavior and anticlinic coupling in chiral smectic free-standing liq.-crystal films)  
 IT Electric field effects  
 (synclinic-anticlinic-synclinic ordering sequence of chiral smectic liq. crystal film surfaces in the presence of an elec. field upon cooling)  
 IT Liquid crystals  
 (transitions; unusual thickness-dependent thermal behavior and anticlinic coupling in chiral smectic free-standing liq.-crystal films)  
 IT Molecular orientation  
 Order  
 (unusual thickness-dependent thermal behavior and anticlinic coupling in chiral smectic free-standing liq.-crystal films)  
 IT 347192-53-4  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (unusual thickness-dependent thermal behavior and anticlinic coupling in chiral smectic free-standing liq.-crystal films)  
 RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Akizuki, T; Jpn J Appl Phys 1999, V38, P4832 CAPLUS  
 (2) Anon; private communication from M D Wand  
 (3) Bahr, C; Phys Rev A 1990, V41, P4335 CAPLUS  
 (4) Bahr, C; Phys Rev A 1992, V46, P7657 CAPLUS  
 (5) Bahr, C; Phys Rev Lett 1993, V70, P1842 CAPLUS  
 (6) Cepic, M; Mol Cryst Liq Cryst 1995, V263, P61  
 (7) Chandani, A; Jpn J Appl Phys 1989, V28, PL1265 CAPLUS  
 (8) Dumrongrattana, S; Phys Rev A 1986, V33, PR2182  
 (9) Fukui, M; Jpn J Appl Phys 1989, V28, PL849 CAPLUS  
 (10) Geer, R; Rev Sci Instrum 1991, V62, P415 CAPLUS  
 (11) Johnson, P; Phys Rev E 2000, V62, P8106 CAPLUS  
 (12) Levelut, A; Phys Rev E 1999, V60, P6803 CAPLUS  
 (13) Link, D; Phys Rev Lett 1996, V77, P2237 CAPLUS  
 (14) Link, D; Phys Rev Lett 1999, V82, P2508 CAPLUS  
 (15) Liu, H; Phys Rev A 1989, V40, P6759  
 (16) Lorman, V; Mol Cryst Liq Cryst 1995, V262, P437  
 (17) Mach, P; Phys Rev Lett 1998, V81, P1015 CAPLUS  
 (18) Meyer, R; J Phys (Paris), Lett 1975, V36, P69



- (19) Pikin, S; Mol Cryst Liq Cryst 1995, V262, P425
- (20) Roy, A; Europhys Lett 1996, V36, P221 CAPLUS
- (21) Shashidhar, R; Phys Rev Lett 1988, V61, P547 CAPLUS
- (22) Stoebe, T; Phys Rev E 1996, V54, P1584 CAPLUS
- (23) Young, C; Phys Rev Lett 1978, V40, P773 CAPLUS

IT 347192-53-4

RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
PROC (Process)

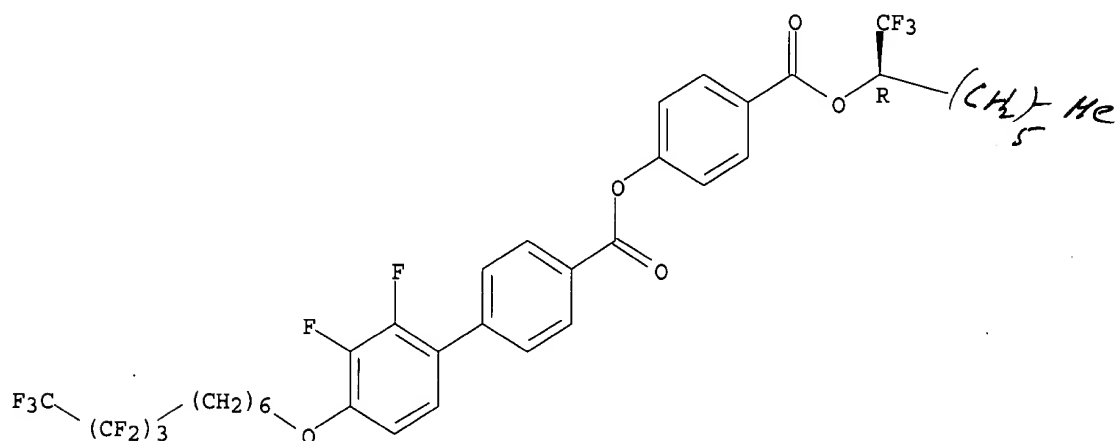
(unusual thickness-dependent thermal behavior and anticlinic coupling  
in chiral smectic free-standing liq.-crystal films)

RN 347192-53-4 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-  
[[7,7,8,8,9,9,10,10,10-nonafluorodecyl)oxy]-, 4-[[[(1R)-1-  
(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



AN 2002:172022 CAPLUS  
 DN 136:224305  
 TI Partially fluorinated liquid crystal material  
 IN Wand, Michael; Gough, Neil; Chen, Xin Hua  
 PA Displaytech, Inc., USA  
 SO PCT Int. Appl., 91 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM C09K019-34  
 ICS C09K019-20; C09K019-12; C07C069-76  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 75

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002018514	A1	20020307	WO 2001-US27182	20010831
	W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	AU 2001085364	A5	20020313	AU 2001-85364	20010831
PRAI	US 2000-229892P	P	20000901		
	US 2001-854181	A	20010511		
	WO 2001-US27182	W	20010831		
OS	MARPAT 136:224305				
AB	The invention provides LC compns. that exhibit V-shaped switching when aligned in an analog device configuration and exhibit bistable switching when aligned in a bookshelf-type device configuration. The invention more specifically provides LC compns. of (R = fluorinated alkyl, ether; A, B, C = 5-6 arom. rings each substituted with 1-4 fluorines and CH can be substituted with N, O, S; d = 0, 1; D = COO, OOC, CH <sub>2</sub> CH <sub>2</sub> , double bond, triple bond; Y = C1-6 alkyl, fluorinated alkyl; R1 = nonchiral tail alkyl with CH <sub>2</sub> group replaced by O, S, etc.) which exhibit bistable switching as well as V-shaped switching when aligned in appropriate device configurations. The invention also provides methods of using the compds. of the invention in making LC compns. and electrooptical devices comprising an aligned layer of the compns. of this invention.				
ST	fluorinated liq crystal compn display				
IT	Liquid crystal displays				
	(partially fluorinated liq. crystal material for)				
IT	Liquid crystals				
	(partially fluorinated liq. crystal material for liq. crystal display)				
IT	119557-43-6 402860-24-6 402860-25-7				
	402860-26-8	402860-27-9	402860-28-0	402860-29-1	
	402860-30-4	402860-31-5	402860-32-6	402860-33-7	402860-34-8
	402860-35-9	402860-36-0	402860-37-1		
	RL: DEV (Device component use); USES (Uses)				
	(partially fluorinated liq. crystal material for liq. crystal display)				
IT	402860-38-2				
	RL: DEV (Device component use); PRP (Properties); USES (Uses)				
	(partially fluorinated liq. crystal material for liq. crystal display)				
IT	347192-53-4P 402860-12-2P 402860-23-5P				
	RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)				
	(partially fluorinated liq. crystal material for liq. crystal display)				
IT	402860-22-4P				
	RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT				

(Reactant or reagent)  
 (partially fluorinated liq. crystal material for liq. crystal display)

IT 402860-19-9P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (prepn. of partially fluorinated liq. crystal material for liq. crystal display)

IT 98-59-9, Tosyl chloride 100-39-0, Benzyl bromide 104-15-4, reactions  
 110-53-2, 1-Bromopentane 110-87-2 120-47-8, Ethyl 4-hydroxybenzoate  
 423-39-2 821-41-0, 5-Hexen-1-ol 1438-82-0, 1,1,1,3,3-Pentamethyldisiloxane 5419-55-6 5798-75-4, Ethyl 4-bromobenzoate  
 6418-38-8, 2,3-Difluorophenol 7103-09-5 15448-47-2, reactions  
 16853-85-3 33036-62-3, 4-Bromobutan-1-ol 121170-45-4,  
 [R]-1-Trifluoromethyl heptanol  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (prepn. of partially fluorinated liq. crystal material for liq. crystal display)

IT 1486-51-7P, 4-Benzyloxybenzoic acid 31608-22-7P 56441-55-5P, Ethyl 4-benzyloxybenzoate 116486-78-3P 121170-46-5P 121170-47-6P  
 144178-30-3P 162082-63-5P 181042-39-7P 228570-09-0P 402860-04-2P  
 402860-05-3P 402860-06-4P 402860-07-5P 402860-08-6P 402860-09-7P  
 402860-10-0P 402860-11-1P 402860-13-3P 402860-14-4P 402860-15-5P  
 402860-16-6P 402860-17-7P 402860-18-8P 402860-20-2P 402860-21-3P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (prepn. of partially fluorinated liq. crystal material for liq. crystal display)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

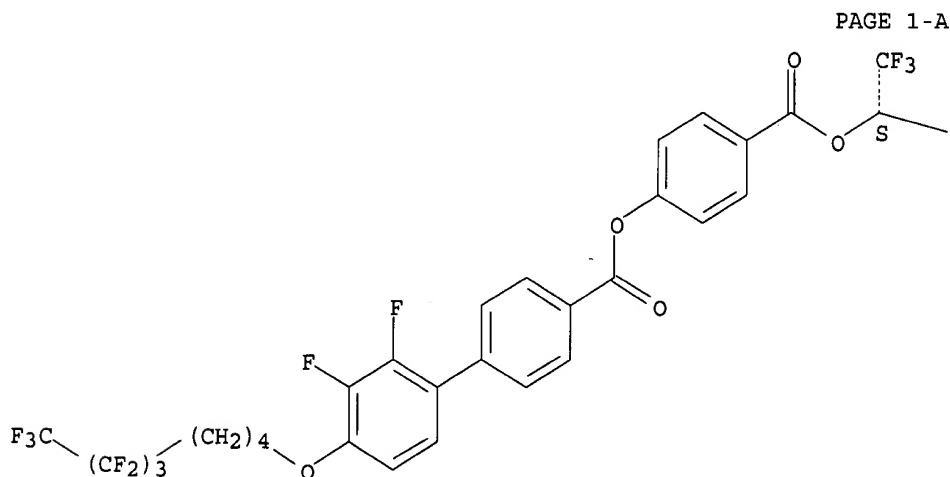
RE  
 (1) Drzewinski; CAPLUS 1198:624787  
 (2) Okabe; JP 882778 1996  
 (3) Suzuki; US 5110497 A 1992 CAPLUS

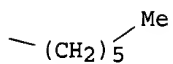
IT 402860-24-6 402860-25-7 402860-26-8  
 RL: DEV (Device component use); USES (Uses)  
 (partially fluorinated liq. crystal material for liq. crystal display)

RN 402860-24-6 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-[(5,5,6,6,7,7,8,8,8-nonafluorooctyl)oxy]-, 4-[[[(1S)-1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

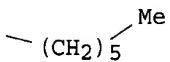
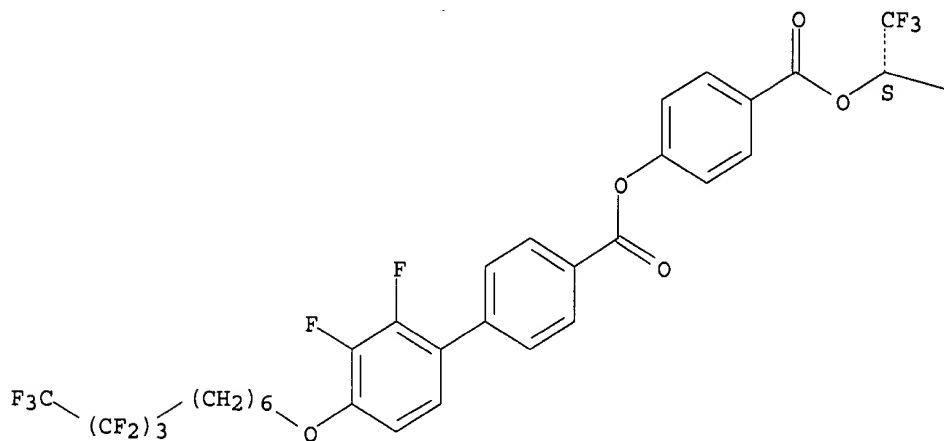
Absolute stereochemistry.





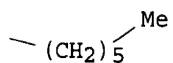
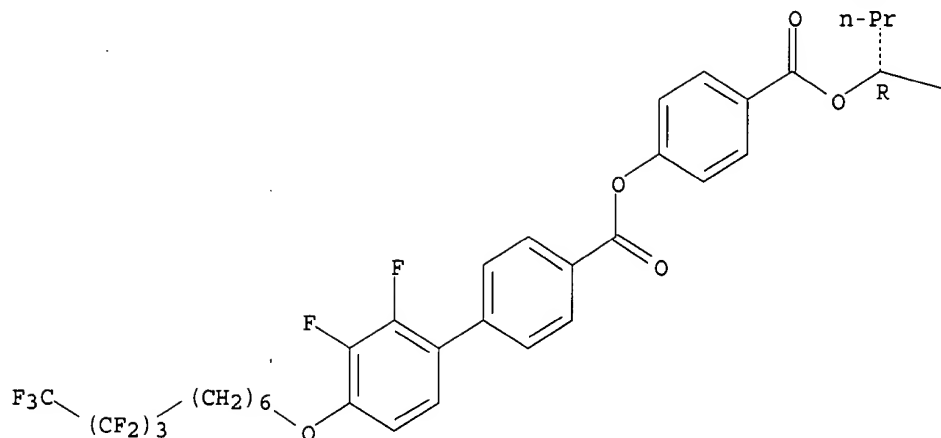
RN 402860-25-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-  
 [(7,7,8,8,9,9,10,10,10-nonafluorodecyl)oxy]-, 4-[[[(1S)-1-  
 (trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.



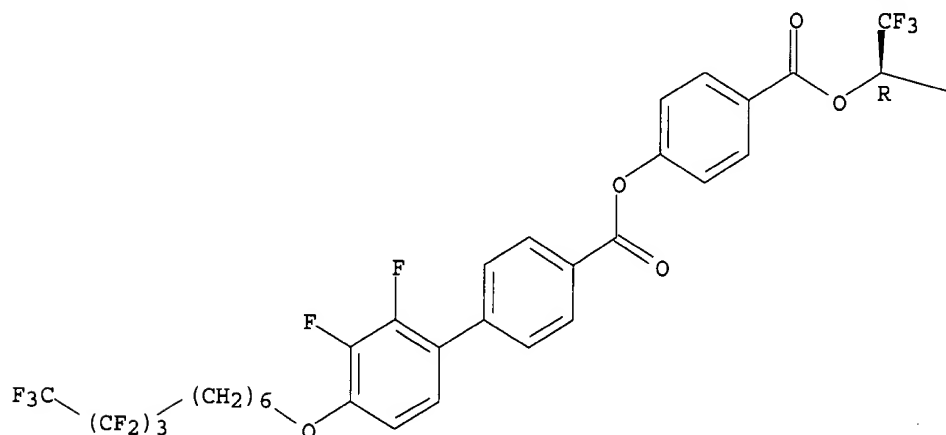
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 CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-  
 [(7,7,8,8,9,9,10,10,10-nonafluorodecyl)oxy]-, 4-[[[(1R)-1-  
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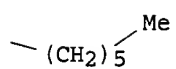
Absolute stereochemistry.



IT 347192-53-4P 402860-12-2P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (partially fluorinated liq. crystal material for liq. crystal display)  
 RN 347192-53-4 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-  
 [(7,7,8,8,9,9,10,10,10-nonafluorodecyl)oxy]-, 4-[[[(1R)-1-  
 (trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

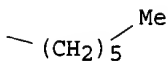
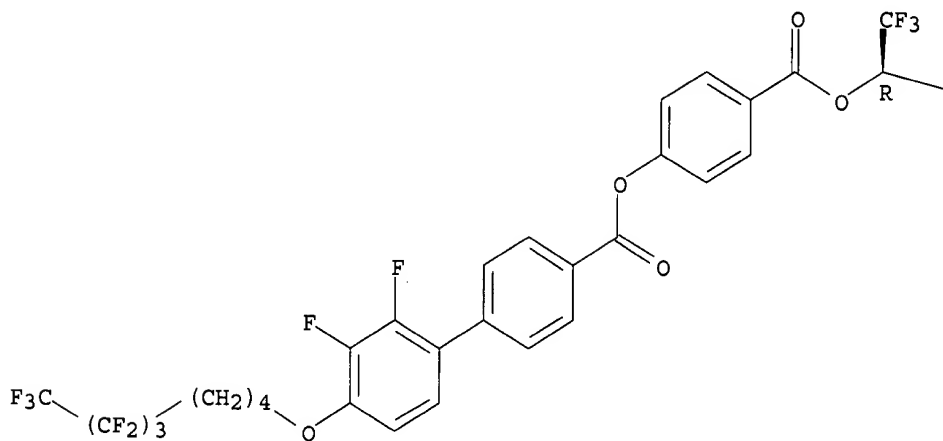




RN 402860-12-2 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'--[(5,5,6,6,7,7,8,8,8-nonafluorooctyl)oxy]-, 4-[[[(1R)-1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

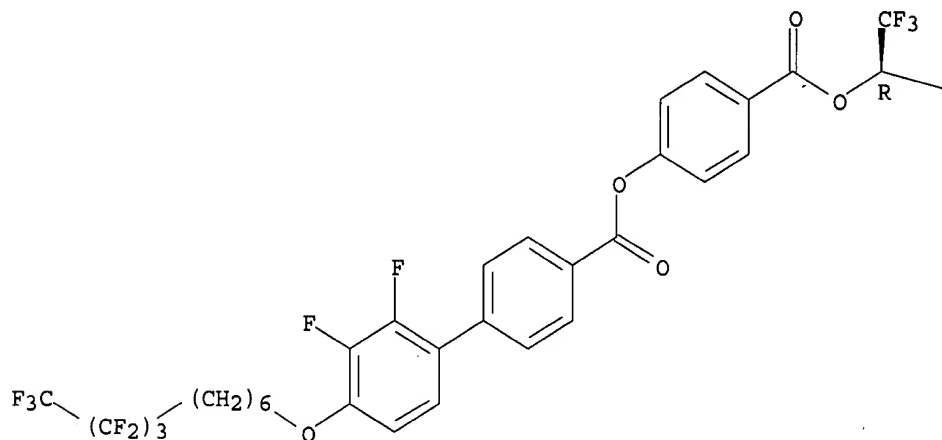


AN 2002:399159 CAPLUS  
 DN 137:177483  
 TI Electro-optic characteristics of de Vries tilted smectic liquid crystals:  
 Analog behavior in the smectic A\* and smectic C\* phases  
 AU Clark, N. A.; Bellini, T.; Shao, R.-F.; Coleman, D.; Bardon, S.; Link, D.  
 R.; MacLennan, J. E.; Chen, X.-H.; Wand, M. D.; Walba, D. M.; Rudquist,  
 P.; Lagerwall, S. T.  
 CS Department of Physics, and Ferroelectric Liquid Crystal Materials Research  
 Centre, University of Colorado, Boulder, CO, 80309, USA  
 SO Applied Physics Letters (2002), 80(22), 4097-4099  
 CODEN: APPLAB; ISSN: 0003-6951  
 PB American Institute of Physics  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 AB Chiral smectic A liq. crystal materials of the de Vries type (with mols.  
 tilted relative to the layer normal) exhibit analog field-induced  
 (electroclinic) optic axis rotation accompanied by an increase in  
 birefringence. The authors identify two such de Vries smectic A\*  
 materials and use them to develop and test models for these characteristic  
 electrooptic effects. These materials also exhibit colossal analog  
 field-induced optic axis rotation in the lower temp. smectic C\* phase, a  
 consequence of polarization charge stabilization, and of polarization  
 screening of the applied field in the liq. crystal.  
 ST electrooptic effect de Vries tilted smectic liq crystal  
 IT Electrooptical effect  
 (electro-optic characteristics of de Vries tilted smectic liq.  
 crystals: analog behavior in smectic A\* and smectic C\* phases)  
 IT Birefringence  
 (of MDW122C4 and MDW122C6 smectic liq. crystals accompanied by  
 field-induced optic axis rotation)  
 IT Liquid crystals  
 (smectic; electro-optic characteristics of de Vries tilted smectic liq.  
 crystals: analog behavior in smectic A\* and smectic C\* phases)  
 IT 347192-53-4 402860-12-2  
 RL: PRP (Properties)  
 (electro-optic characteristics of de Vries tilted smectic liq.  
 crystals: analog behavior in smectic A\* and smectic C\* phases)  
 RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Bahr, C; Phys Rev A 1991, V44, P3669 CAPLUS  
 (2) Bahr, C; Phys Rev A 1991, V41, P4335  
 (3) Bahr, C; Physica A 1991, V174, P139 CAPLUS  
 (4) Bartoli, F; Phys Rev E 1997, V55, PR1271 CAPLUS  
 (5) Clark, N; Appl Phys Lett 1980, V36, P899 CAPLUS  
 (6) Clark, N; J Mater Chem 1999, V9, P1257  
 (7) Clark, N; Liq Cryst 2000, V27, P985 CAPLUS  
 (8) de Vries, A; Mol Cryst Liq Cryst 1977, V41, P27 CAPLUS  
 (9) Fukuda, A; Proceedings of the 15th International Display Research  
 Conference of the SID 1995, P61  
 (10) Garoff, S; Phys Rev A 1979, V19, P338 CAPLUS  
 (11) Garoff, S; Phys Rev Lett 1977, V38, P848 CAPLUS  
 (12) Inui, S; J Mater Chem 1996, V6, P671 CAPLUS  
 (13) Lagerwall, S; Ferroelectric and Antiferroelectric Liquid Crystals 1999  
 (14) Meyer, R; J Phys (France) 1975, V36, PL-69  
 (15) Rudquist, P; Digest of Technical Papers of the SID International Symposium  
 1999, P409  
 (16) Selinger, J; Phys Rev E 2001, V64, P061705 MEDLINE  
 (17) Zhuang, Z; Proc SPIE 1989, V1080, P110 CAPLUS  
 IT 347192-53-4 402860-12-2  
 RL: PRP (Properties)  
 (electro-optic characteristics of de Vries tilted smectic liq.  
 crystals: analog behavior in smectic A\* and smectic C\* phases)  
 RN 347192-53-4 CAPLUS

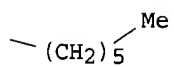
CN [1,1'-Biphenyl]-4-carboxylic acid, 2',3'-difluoro-4'-  
 [(7,7,8,8,9,9,10,10,10-nonafluorodecyl)oxy]-, 4-[[[(1R)-1-  
 (trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

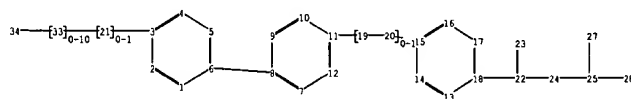
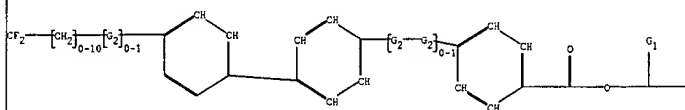
PAGE 1-A



PAGE 1-B







chain nodes :

19 20 21 22 23 24 25 27 28 33 34

ring nodes :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

chain bonds :

3-21 6-8 11-19 15-20 18-22 19-20 21-33 22-23 22-24 24-25 25-27 25-28 33-34

ring bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12 13-14 13-18 14-15  
15-16 16-17 17-18

exact/norm bonds :

3-21 11-19 15-20 19-20 21-33 22-23 22-24 24-25 25-27

exact bonds :

6-8 18-22 25-28 33-34

normalized bonds :

1-2 1-6 2-3 3-4 4-5 5-6 7-8 7-12 8-9 9-10 10-11 11-12 13-14 13-18 14-15  
15-16 16-17 17-18

G1:CH3,Et,n-Pr,CF3

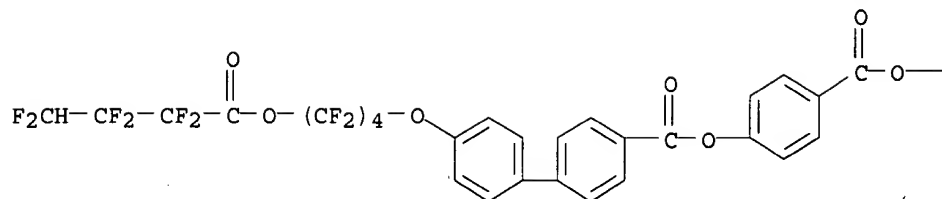
G2:C,O

Match level :

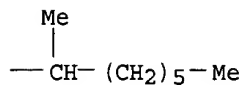
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12:Atom 13:Atom 14:Atom 15:Atom 16:Atom 17:Atom 18:Atom 19:CLASS 20:CLASS  
21:CLASS 22:CLASS 23:CLASS 24:CLASS 25:CLASS 27:CLASS 28:CLASS 33:CLASS 34:CLASS

AN 1998:624787 CAPLUS  
 DN 129:338458  
 TI Antiferroelectric liquid crystals with fluorinated parts of terminal chains. II. Investigations of liquid crystalline phases by miscibility, polarizing thermomicroscopic and differential scanning calorimetry (DSC) methods  
 AU Drzewinski, Witold; Dabrowski, Roman; Czuprynski, Krzysztof; Kening, Krystyna  
 CS Instytut Chemii WAT, Warsaw, 01-489, Pol.  
 SO Biuletyn Wojskowej Akademii Technicznej (1998), 47(7-8), 69-88  
 CODEN: BWATFP; ISSN: 1234-5865  
 PB Wojskowa Akademia Techniczna  
 DT Journal  
 LA Polish  
 CC 76-8 (Electric Phenomena)  
 Section cross-reference(s): 75  
 AB Using the DSC and thermomicroscopic methods phase transitions were measured of compds. belonging to seven homologous series:  
 4'-(octyl-2-oxycarbonyl)phenyl 4-(alkanoyloxy-alkoxy)-(1) or  
 4-(perfluorslkanoyloxyalkoxy)-(2) or 4-(ethoxyalkoxy)-(3) or  
 4-(2,2,2-trifluoroethoxyalkoxy)biphenyl-4-yl 4'-(1H,1H,2H,2H-perfluoro-octyloxy)-(6) or 4-(ethoxyalkoxy)-(7) benzoates. The smectic phases were identified by microscopic textures and miscibility studies with std. compds. The presence of tilted phases IA\*, CA\* and C\* was obsd. in the series 1, 2, 3 and 4. The compds. of series 2 show antiferroelec. CA\* phase for short as well as long perfluoroacyl groups.  
 ST fluoro antiferroelec liq crystal homologous series  
 IT Liquid crystals  
 (antiferroelec.; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Antiferroelectric materials  
 (liq.-crystal; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Homologous series  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Liquid crystals  
 (smectic A; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Liquid crystals  
 (smectic C; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 109204-50-4 123286-51-1, MHPOBC 210753-35-8 215234-20-1  
 215234-21-2 215234-23-4 215234-24-5 215234-26-7 215234-27-8  
 215234-28-9 215234-29-0 215234-30-3  
 215234-31-4 215234-32-5 215234-33-6 215234-34-7  
 215234-35-8 215234-36-9 215234-37-0 215234-39-2  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
 PROC (Process)  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 215234-28-9 215234-29-0 215234-30-3  
 215234-31-4 215234-32-5  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
 PROC (Process)  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 RN 215234-28-9 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3,4,4-octafluoro-4-(2,2,3,3,4,4-hexafluoro-1-oxobutoxy)butoxy]-, 4-[[[1-methylheptyl)oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

PAGE 1-A



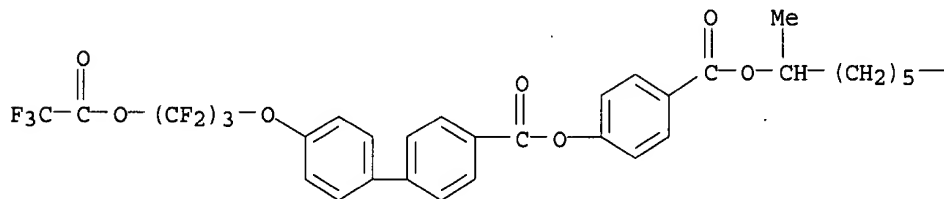
PAGE 1-B



RN 215234-29-0 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-  
[(trifluoroacetyl)oxy]propoxy]-, 4-[[1-(1-methylheptyl)oxy]carbonyl]phenyl  
ester (9CI) (CA INDEX NAME)

PAGE 1-A



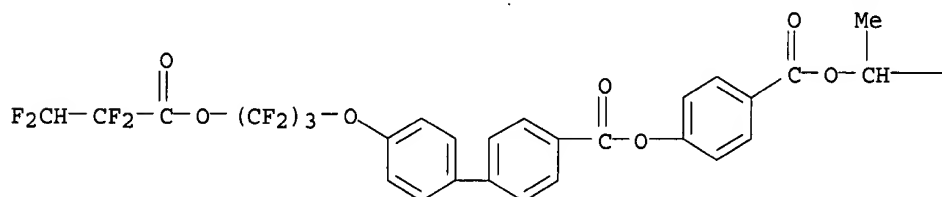
PAGE 1-B

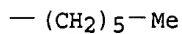
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RN 215234-30-3 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-(2,2,3,3-  
tetrafluoro-1-oxopropoxy)propoxy]-, 4-[[1-(1-methylheptyl)oxy]carbonyl]phenyl  
1 ester (9CI) (CA INDEX NAME)

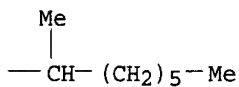
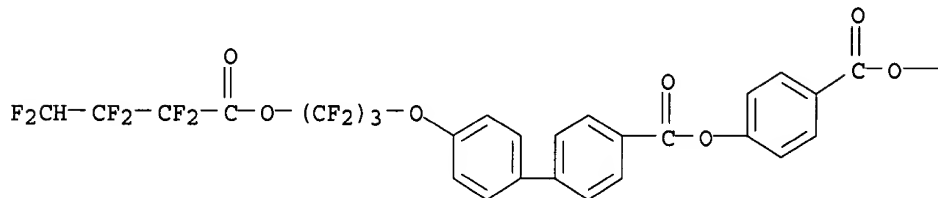
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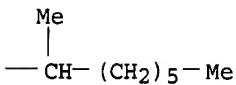
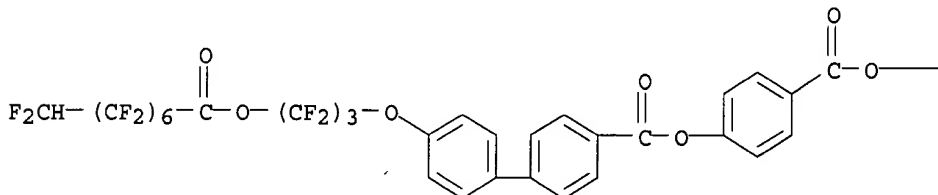
RN 215234-31-4 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-(2,2,3,3,4,4-hexafluoro-1-oxobutoxy)propoxy]-, 4-[[1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)



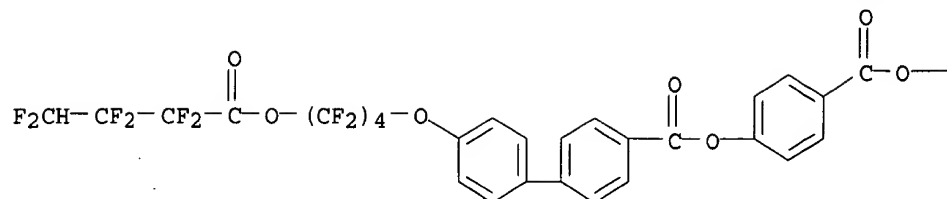
RN 215234-32-5 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-[(2,2,3,3,4,4,5,5,6,6,7,7,8,8-tetradecafluoro-1-oxooctyl)oxy]propoxy]-, 4-[[1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

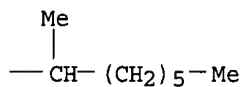


DN 129:338458  
 TI Antiferroelectric liquid crystals with fluorinated parts of terminal chains. II. Investigations of liquid crystalline phases by miscibility, polarizing thermomicroscopic and differential scanning calorimetry (DSC) methods  
 AU Drzewinski, Witold; Dabrowski, Roman; Czuprynski, Krzysztof; Kening, Krystyna  
 CS Instytut Chemii WAT, Warsaw, 01-489, Pol.  
 SO Biuletyn Wojskowej Akademii Technicznej (1998), 47(7-8), 69-88  
 CODEN: BWATFP; ISSN: 1234-5865  
 PB Wojskowa Akademia Techniczna  
 DT Journal  
 LA Polish  
 CC 76-8 (Electric Phenomena)  
 Section cross-reference(s): 75  
 AB Using the DSC and thermomicroscopic methods phase transitions were measured of compds. belonging to seven homologous series:  
 4'-(octyl-2-oxycarbonyl)phenyl 4-(alkanoyloxy-alkoxy)-(1) or 4-(perfluorslkanoyloxyalkoxy)-(2) or 4-(ethoxyalkoxy)-(3) or 4-(2,2,2-trifluoroethoxyalkoxy)biphenyl-4-yl 4'-(1H,1H,2H,2H-perfluoro-octyloxy)-(6) or 4-(ethoxyalkoxy)-(7) benzoates. The smectic phases were identified by microscopic textures and miscibility studies with std. compds. The presence of tilted phases IA\*, CA\* and C\* was obsd. in the series 1, 2, 3 and 4. The compds. of series 2 show antiferroelec. CA\* phase for short as well as long perfluoroacyl groups.  
 ST fluoro antiferroelec liq crystal homologous series  
 IT Liquid crystals  
 (antiferroelec.; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Antiferroelectric materials  
 (liq.-crystal; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Homologous series  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Liquid crystals  
 (smectic A; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT Liquid crystals  
 (smectic C; properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 109204-50-4 123286-51-1, MHPOBC 210753-35-8 215234-20-1  
 215234-21-2 215234-23-4 215234-24-5 215234-26-7 215234-27-8  
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 215234-31-4 215234-32-5 215234-33-6 215234-34-7  
 215234-35-8 215234-36-9 215234-37-0 215234-39-2  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 IT 215234-28-9 215234-29-0 215234-30-3  
 215234-31-4 215234-32-5  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (properties of antiferroelec. liq. crystals with fluorinated parts of terminal chains)  
 RN 215234-28-9 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3,4,4-octafluoro-4-(2,2,3,3,4,4-hexafluoro-1-oxobutoxy)butoxy]-, 4-[[1-(methylheptyl)oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

PAGE 1-A

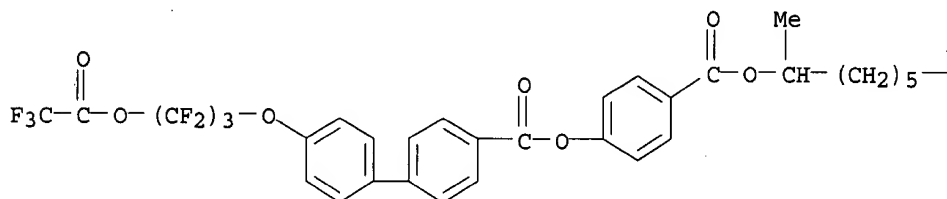


PAGE 1-B



RN 215234-29-0 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'--[1,1,2,2,3,3-hexafluoro-3-  
 [(trifluoroacetyl)oxy]propoxy]-, 4-[[1-(1-methylheptyl)oxy]carbonyl]phenyl  
 ester (9CI) (CA INDEX NAME)

PAGE 1-A

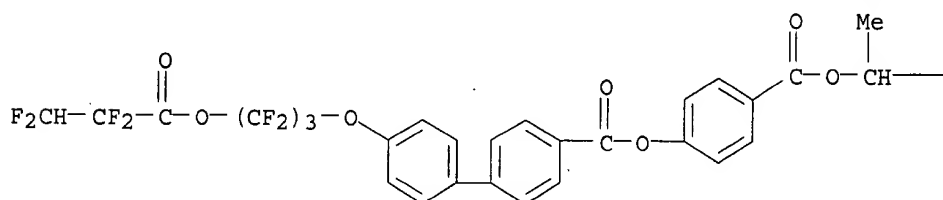


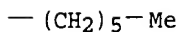
PAGE 1-B

— Me

RN 215234-30-3 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'--[1,1,2,2,3,3-hexafluoro-3-(2,2,3,3-  
 tetrafluoro-1-oxopropoxy)propoxy]-, 4-[[1-(1-methylheptyl)oxy]carbonyl]phenyl  
 ester (9CI) (CA INDEX NAME)

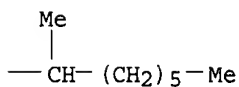
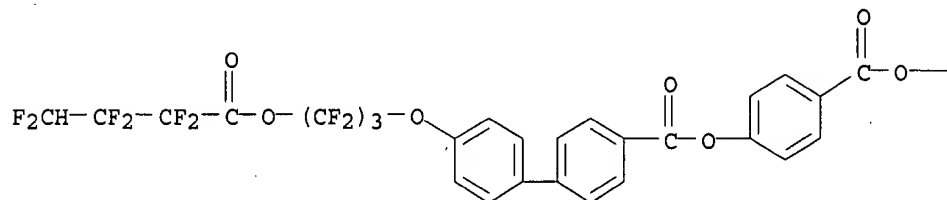
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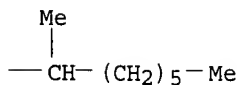
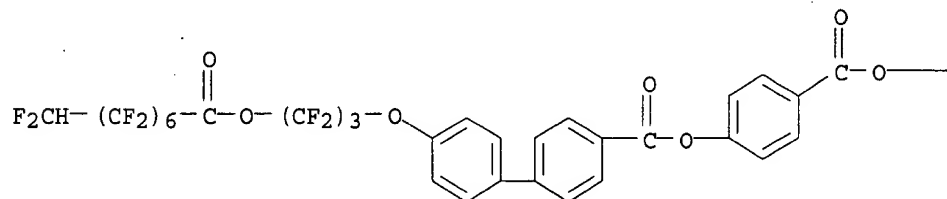
RN 215234-31-4 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-(2,2,3,3,4,4-hexafluoro-1-oxobutoxy)propoxy]-, 4-[[[1-methylheptyl)oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)



RN 215234-32-5 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[1,1,2,2,3,3-hexafluoro-3-[(2,2,3,3,4,4,5,5,6,6,7,7,8,8-tetradecafluoro-1-oxooctyl)oxy]propoxy]-, 4-[[[1-methylheptyl)oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)



AN 1992:49354 CAPLUS  
 DN 116:49354  
 TI Optically active compound for liquid-crystal compositions and  
 liquid-crystal compositions containing it  
 IN Suzuki, Yoshiichi; Sakuma, Shigenori; Yamakawa, Noriko  
 PA Showa Shell Sekiyu K. K., Japan  
 SO Eur. Pat. Appl., 14 pp.  
 CODEN: EPXXDW

DT Patent

LA English

IC ICM C09K019-20

ICS C09K019-46

CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 74, 76

FAN.CNT 1

PATENT NO.	KIND	DATE
EP 439190	A2	19910731
EP 439190	A3	19920115
EP 439190	B1	19950906
R: DE, FR, GB		
JP 03221588	A2	19910930
US 5110497	A	19920505
		19900126

APPLICATION NO.	DATE
EP 1991-100982	19910125

PRAI JP 1990-17459

OS MARPAT 116:49354

AB The compd. has the general formula  $R_1XAYBZCH(R_3)R_2$ , where  $R_1 = C_1-18$  fluoroalkyl;  $R_2 = C_1-16$  alkyl or  $C_6-16$  aralkyl;  $R_3 = C_2F_5, CF_3, CHF_2$ , or  $CH_2F$ ;  $X =$  single bond, O, COO, or OCO;  $Y = COO, OCO, CH_2O$ , or  $OCH_2$ ;  $Z = COO$  or  $O$ ; and A,B = cyclic groups.

ST optically active compd liq crystal compn; fluorinated compd liq crystal compn

IT Optical imaging devices (electro-, liq.-crystal, mixts. for, optically active compds. for)

IT Liquid crystals (ferroelec., mixts., optically active compds. for)

IT Ferroelectric substances (liq.-crystal, mixts., optically active compds. for)

IT 138345-58-1

RL: PRP (Properties)

(liq. crystal, for display devices)

IT 121170-46-5P 121170-47-6P 138509-07-6P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(prepn. and reaction of, in formation of optically active compds. for liq.-crystal compns.)

IT 138345-57-0P 138509-06-5P  
 RL: SPN (Synthetic preparation); PREP (Preparation)

(prepn. of, for liq.-crystal compns.)

IT 138345-58-1

RL: PRP (Properties)

(liq. crystal, for display devices)

RN 138345-58-1 CAPLUS

CM [1,1'-Biphenyl]-4-carboxylic acid, 4'-(octyloxy)-, 4-(octyloxy)phenyl ester, mixt. with (R)-4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy] [1,1'-biphenyl]-4-carboxylate (9CI) (CA INDEX NAME)

CM 1

CRN 138345-57-0

CMF C36 H30 F16 O5

Absolute stereochemistry.



AN 1999:624161 CAPLUS  
 DN 131:344498  
 TI New antiferroelectric compounds containing partially fluorinated terminal chains. Synthesis and mesomorphic properties  
 AU Drzewinski, Witold; Czuprynski, Krzysztof; Dabrowski, Roman; Neubert, Mary  
 CS Institute of Chemistry, Military University of Technology, Warsaw, 00-908, Pol.  
 SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (1999), 328, 401-410  
 CODEN: MCLCE9; ISSN: 1058-725X  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 25, 76  
 AB Methods for prepg. optically active hydroxyesters: 1-hydroxy-4-(1-methylheptyloxycarbonyl)benzene and 4-hydroxy-4'-(1-methylheptyloxycarbonyl)biphenyl, 4-(1-methylheptyloxycarbonyl)phenyl 4'-hydroxybiphenyl-4-carboxylate and 4'-(1-methylheptyloxycarbonyl)biphenyl-4-yl 4-hydroxybenzoate were elaborated. These compds. were used as intermediates for prepg. liq. cryst. homologous series of di- and triesters exhibiting tilted smectic phases CA\* and C. The phase transitions were measured by DSC and thermomicroscopic methods and the smectic phases were identified by microscopic textures and miscibility studies.  
 ST antiferroelec hydroxyester deriv partially fluorinated terminal chain mesomorphism  
 IT Liquid crystals  
 (antiferroelec.; prepn. and properties of di- and triesters exhibiting tilted smectic CA\* and C phases)  
 IT Antiferroelectric materials  
 (liq.-crystal; prepn. and properties of di- and triesters exhibiting tilted smectic CA\* and C phases)  
 IT Homologous series  
 (prepn. and properties of di- and triesters exhibiting tilted smectic CA\* and C phases)  
 IT Liquid crystals  
 (transitions; of hydroxyester derivs. contg. partially fluorinated terminal chain)  
 IT 205435-20-7P 205435-21-8P 210753-28-9P 210753-29-0P 210753-30-3P  
 210753-31-4P 210753-32-5P 210753-33-6P 210753-34-7P 215929-83-2P  
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 250130-30-4P 250130-32-6P 250130-33-7P 250130-34-8P  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
 (synthesis and mesomorphic properties)

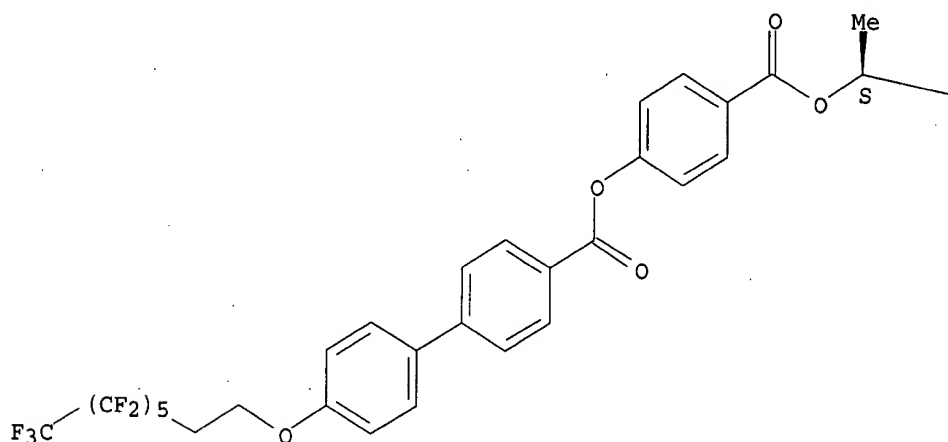
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE

- (1) Arai, Y; EP 585032 1993 CAPLUS
- (2) Chiang, C; Mol Cryst Liq Cryst 1991, V208, P85
- (3) Drzewinski, W; Biul WAT 1998, VXLVII(7-8)
- (4) Drzewinski, W; SPIE 1997, V3319, P100
- (5) Drzewinski, W; to be published in Ferroelectrics 1998
- (6) Fafara, A; to be published in Ferroelectrics 1998
- (7) Goodby, J; J Mater Chem 1992, V2, P197 CAPLUS
- (8) Hiraoka, K; Jpn J App Phys 1990, V29(Part 2), P103
- (9) Isozaki, T; J Mater Chem 1994, V4, P237 CAPLUS
- (10) Janulis, E; Ferroelectrics 1988, V85, P375
- (11) Kobayashi, T; EP 225195 CAPLUS
- (12) Liu, H; Liq Cryst 1998, V24, P719 CAPLUS
- (13) Manhas, M; JCS Perkin 1975, P461 CAPLUS
- (14) Moritake, H; Ferroelectrics 1993, V147, P53 CAPLUS
- (15) Przedmojski, J; Mol Cryst Liq Cryst, Proceedings ILCC'98
- (16) Stebler, B; Information Display 1998, V14(2), P20

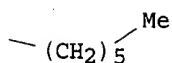
(17) Surgu, P; Information Display 1998, V14(2), P34  
 (18) Suzuki, Y; EP 402233 1990 CAPLUS  
 (19) Suzuki, Y; Ferroelectrics 1993, V147, P109 CAPLUS  
 IT 250130-33-7P  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN  
 (Synthetic preparation); PREP (Preparation); PROC (Process)  
 (synthesis and mesomorphic properties)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-  
 tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl  
 ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

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PAGE 1-B



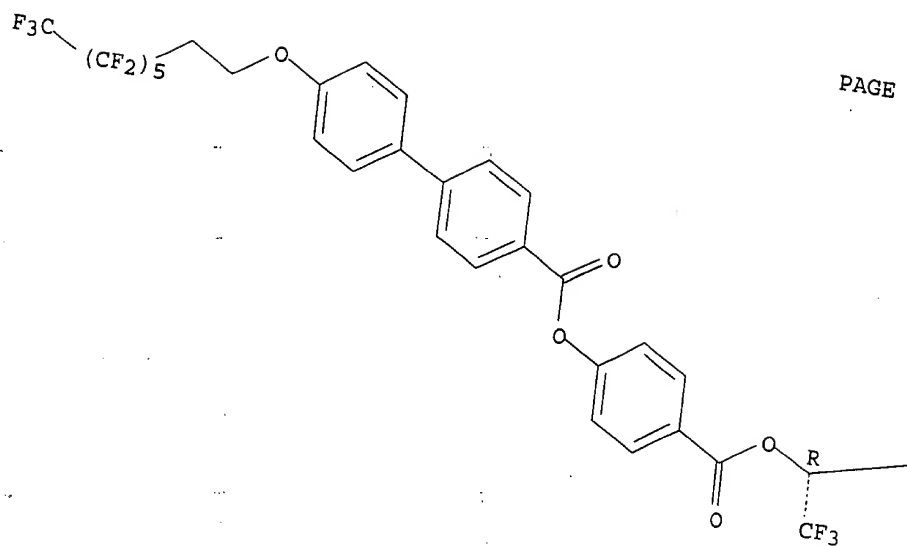
AN 1996:359696 CAPLUS  
 DN 125:45261  
 TI Antiferroelectric liquid-crystal composition  
 IN Okabe, Nobuhiro; Hashimoto, Shigeji; Isozaki, Tadaaki; Hagiwara, Takashi;  
 Suzuki, Giichi; Kawamura, Ichiro  
 PA Showa Shell Sekiyu, Japan  
 SO Jpn. Kokai Tokyo Koho, 80 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM G02F001-13  
 ICS C09K019-20; C09K019-30; C09K019-32; C09K019-34; C09K019-42;  
 C09K019-44; C09K019-46  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other  
 Reprographic Processes)  
 Section cross-reference(s): 75

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 08082778	A2	19960326	JP 1994-243320	19940912
AB	The antiferroelec. liq.-crystal compn. contains .gtoreq.2 antiferroelec. liq.-crystal compds., or contains .gtoreq.1 antiferroelec. liq.-crystal compd. and .gtoreq.1 ferroelec. liq.-crystal compd. This compn. can be used in a display device for fast response.				
ST	antiferroelec liq crystal compn display				
IT	Liquid crystals				
	(antiferroelec. liq.-crystal compn.)				
IT	Optical imaging devices				
	(liq.-crystal, antiferroelec. liq.-crystal compn. for)				
IT	177651-38-6	177651-39-7	177651-42-2	177651-43-3	177651-44-4
	177651-46-6	177651-48-8	177651-49-9	177651-51-3	177651-53-5
	177651-55-7	177651-57-9	177651-59-1	177651-61-5	177651-63-7
	177651-65-9	177651-67-1	177651-69-3	177651-71-7	177651-73-9
	177651-75-1	177651-77-3	177651-79-5	177651-81-9	177651-82-0
	177651-84-2	177651-86-4	177651-88-6	177651-89-0	
	177929-85-0	177929-86-1	177929-87-2	177929-88-3	177929-89-4
	177929-90-7	177929-91-8			
RL:	DEV (Device component use); USES (Uses)				
	(liq.-crystal compn.)				
IT	177651-86-4				
RL:	DEV (Device component use); USES (Uses)				
	(liq.-crystal compn.)				
RN	177651-86-4 CAPLUS				
CN	[1,1'-Biphenyl]-4-carboxylic acid, 4'-decyl-, 4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester, (R)-, mixt. with (R)-3-fluoro-4-[[[1-methylheptyl]oxy]carbonyl]phenyl 4'-dodecyl [1,1'-biphenyl]-4-carboxylate, (R)-1-methylheptyl 4'-[(4-nonylbenzoyl)oxy] [1,1'-biphenyl]-4-carboxylate, 4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy] [1,1'-biphenyl]-4-carboxylate, (R)-4-[[[1-(trifluoromethyl)pentyl]oxy]carbonyl]phenyl 4'-decyl [1,1'-biphenyl]-4-carboxylate and (R)-4-[[[1-(trifluoromethyl)pentyl]oxy]carbonyl]phenyl 4'-(undecyloxy) [1,1'-biphenyl]-4-carboxylate (9CI) (CA INDEX NAME)				

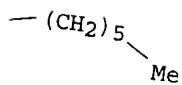
CM 1

CRN 177651-85-3  
 CMF C36 H30 F16 O5



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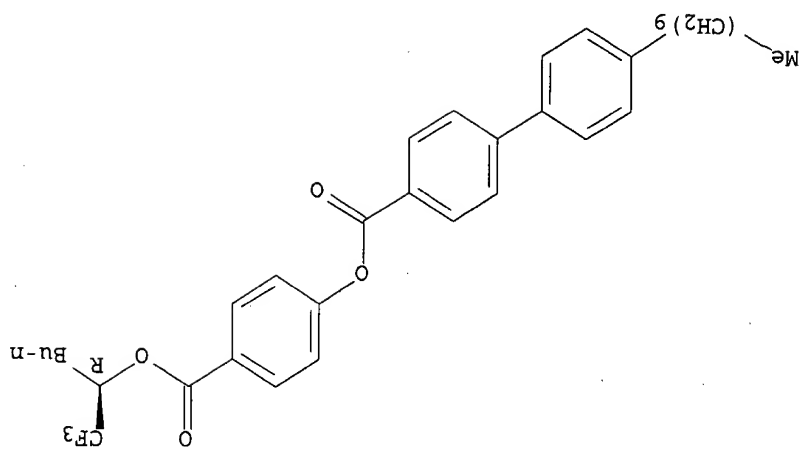
PAGE 1-B



Absolute stereochemistry.

CRN 177651-40-0  
CMF C37 H45 F3 O5

CM 3



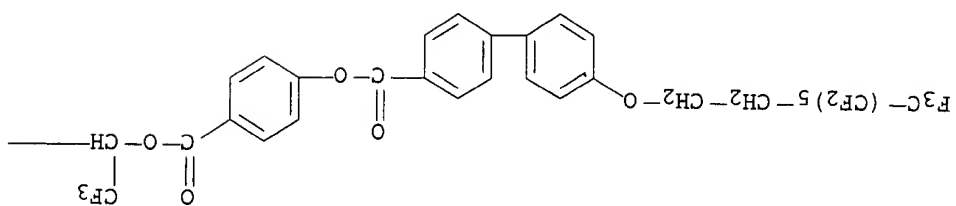
Absolute stereochemistry.

CRN 177651-41-1  
CME C36 H43 F3 O4

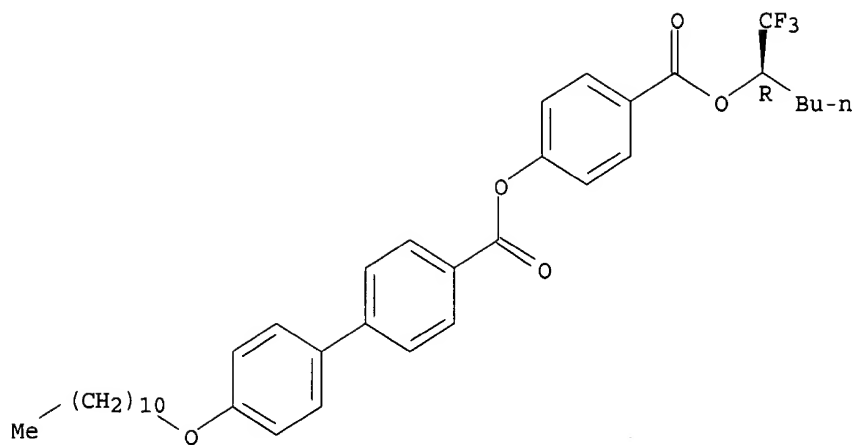
2 CM

$$-(CH_2)_5-Me$$

PAGE 1-B



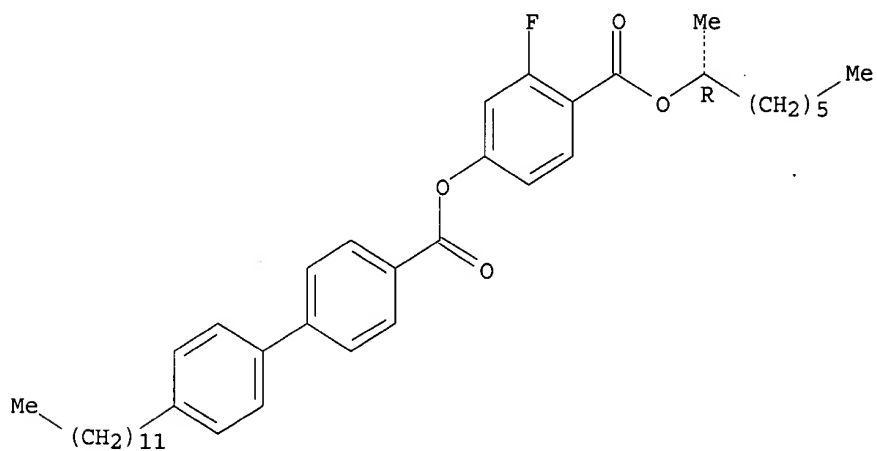
PAGE 1-A



CM 4

CRN 173926-67-5  
CMF C40 H53 F O4

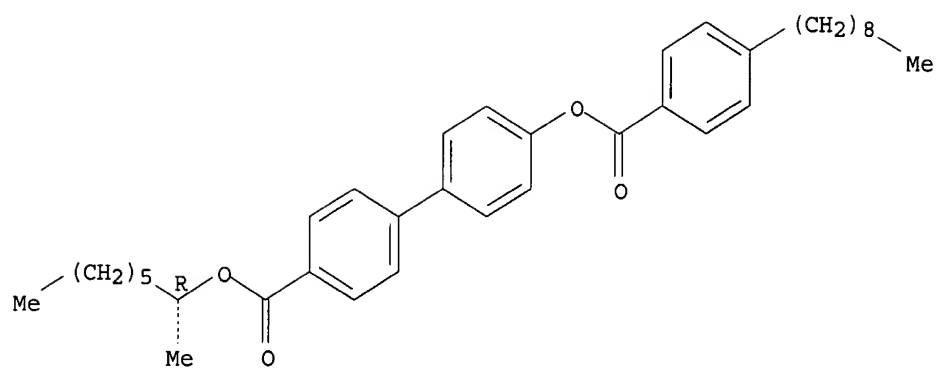
Absolute stereochemistry.



CM 5

CRN 170636-41-6  
CMF C37 H48 O4

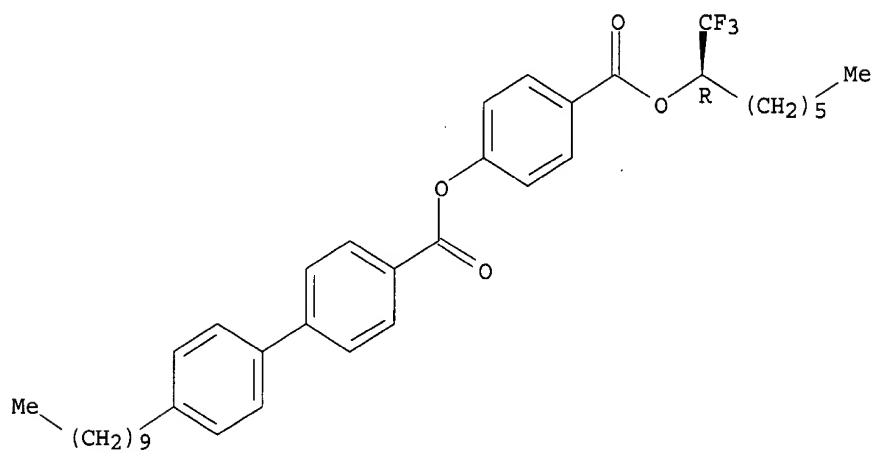
Absolute stereochemistry.



CM 6

CRN 170636-31-4  
CMF C38 H47 F3 O4

Absolute stereochemistry.

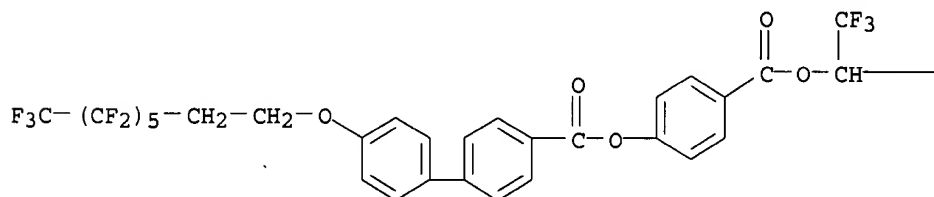


AN 1996:461960 CAPLUS  
 DN 125:128025  
 TI Liquid crystal-improving agent useful for preparing antiferroelectric liquid crystal compositions  
 IN Okabe, Nobuhiro; Hashimoto, Shigeji  
 PA Showa Shell Sekiyu, Japan  
 SO Jpn. Kokai Tokkyo Koho, 7 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM C09K019-54  
 ICS G02F001-13; G02F001-137  
 CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): 75  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 08113784	A2	19960507	JP 1994-277113	19941017

OS MARPAT 125:128025  
 AB The title agent has the general formula  $p\text{-CmF}_{2m+1}\text{CnH}_{2n}\text{X}(\text{C}_6\text{H}_4)_r\text{CO}_2\text{C}_6\text{H}_4\text{CO}_2\text{CH}_2\text{CpF}_2\text{p}+1\text{-p}$  (I;  $m = 1\text{-}14$ ;  $n = 0\text{-}13$ ;  $X = \text{a single bond, O, CO}_2, \text{OCO}$ ;  $r = 1, 2$ ;  $p = 2\text{-}12$ ;  $Z = \text{Me, CF}_3$ ). The agent is useful for prepg. liq. crystal compns. with improved memory margin enough to be used as displays, esp. antiferroelec. liq. crystal compns. Thus, I ( $m = 6, n = 2, X = \text{O}, r = 2, Z = \text{CF}_3, p = 6$ ) was used as the agent.  
 ST liq crystal improving agent benzoate  
 IT Optical imaging devices  
 RL: DEV (Device component use); USES (Uses)  
 (liq.-crystal, benzoate deriv. liq. crystal characteristics improving agent)  
 IT 177651-85-3 177651-87-5  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (benzoate deriv. liq. crystal characteristics improving agent)  
 IT 179128-72-4 179128-73-5  
 RL: DEV (Device component use); USES (Uses)  
 (liq. crystal compn. contg. liq. crystal characteristics improving agent)  
 IT 177651-85-3  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (benzoate deriv. liq. crystal characteristics improving agent)  
 RN 177651-85-3 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

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— (CH<sub>2</sub>)<sub>5</sub>—Me

IT 179128-72-4

RL: DEV (Device component use); USES (Uses)

(liq. crystal compn. contg. liq. crystal characteristics improving agent)

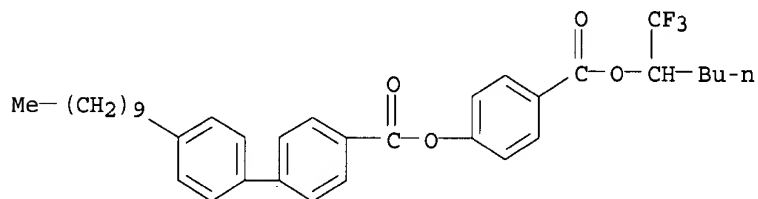
RN 179128-72-4 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-decyl-, 4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl ester, mixt. with 3-fluoro-4-[[[1-(1-methylheptyl)oxy]carbonyl]phenyl 4'-dodecyl[1,1'-biphenyl]-4-carboxylate, 1-methylheptyl 4'-[(4-nonylbenzoyl)oxy][1,1'-biphenyl]-4-carboxylate, 4-[[[1-(trifluoromethyl)heptyl]oxy]carbonyl]phenyl 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy][1,1'-biphenyl]-4-carboxylate, 4-[[[1-(trifluoromethyl)pentyl]oxy]carbonyl]phenyl 4'-decyl[1,1'-biphenyl]-4-carboxylate and 4-[[[1-(trifluoromethyl)pentyl]oxy]carbonyl]phenyl 4'-(undecyloxy)[1,1'-biphenyl]-4-carboxylate (9CI) (CA INDEX NAME)

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CRN 179128-71-3

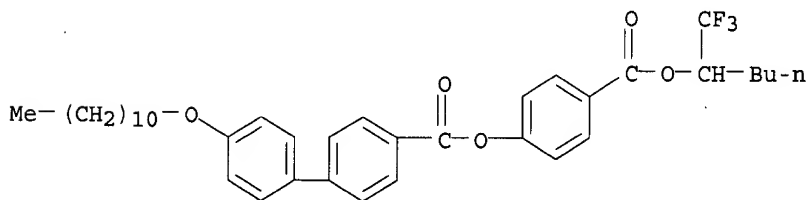
CMF C36 H43 F3 O4



CM 2

CRN 179128-70-2

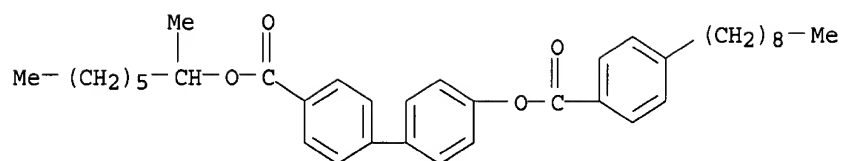
CMF C37 H45 F3 O5



CM 3

CRN 179128-69-9

CMF C37 H48 O4

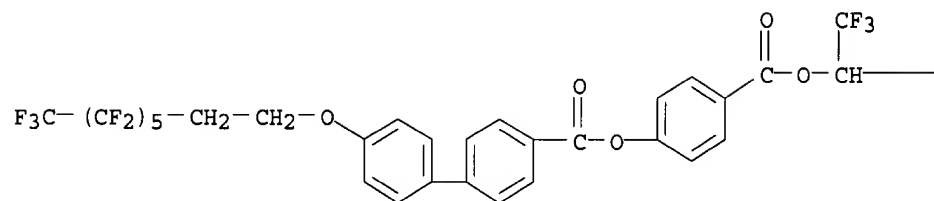


CM 4

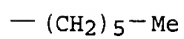
CRN 177651-85-3

CMF C36 H30 F16 O5

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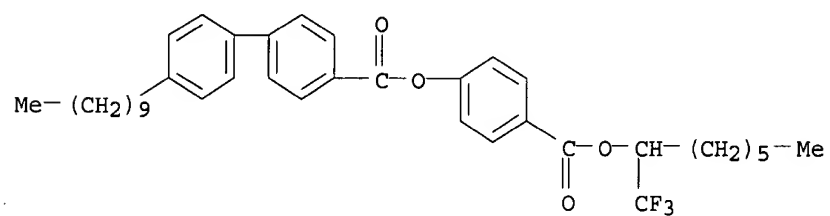
PAGE 1-B



CM 5

CRN 131119-13-6

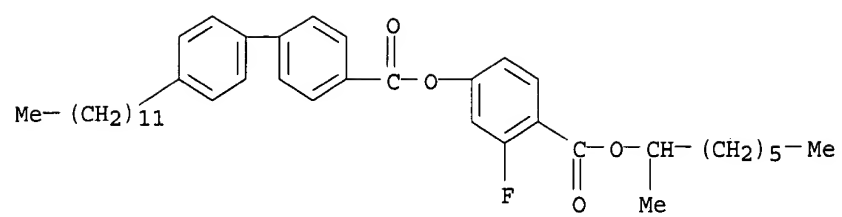
CMF C38 H47 F3 O4



CM 6

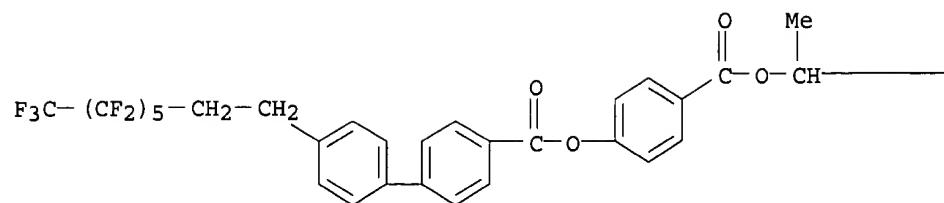
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CMF C40 H53 F O4

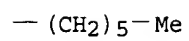


AN 2000:417715 CAPLUS  
 DN 133:260141  
 TI Metastable states in antiferroelectric liquid crystals  
 AU Goc, F.; Kuczynski, Wojciech; Dabrowski, Roman S.  
 CS Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Pol.  
 SO Proceedings of SPIE-The International Society for Optical Engineering  
 (2000), 4147(Liquid Crystals), 75-78  
 CODEN: PSISDG; ISSN: 0277-786X  
 PB SPIE-The International Society for Optical Engineering  
 DT Journal  
 LA English  
 CC 76-8 (Electric Phenomena)  
 Section cross-reference(s): 75  
 AB Studies of a mixt. possessing induced antiferroelec. phase are described.  
 This mixt. exhibited large thermal hysteresis of the transition between  
 ferroelec. and antiferroelec. phases, which was demonstrated using dielec.  
 and optical methods. Very slow kinetics (ranging from minutes to days) of  
 the transition smectic C ARLR smectic CA was revealed. The coexistence of  
 ferroelec. and antiferroelec. states was noticed. In the studied mixt.  
 the V-shaped switching was obsd. The obsd. phenomena: hysteresis, slow  
 kinetics and threshold-less switching are probably caused by competition  
 of ferroelec. and antiferroelec. interactions acting between smectic  
 layers.  
 ST antiferroelec liq crystal metastable state  
 IT Liquid crystals  
 Liquid crystals  
 (antiferroelec.; metastable states in antiferroelec. liq. crystals)  
 IT Antiferroelectric materials  
 Antiferroelectric materials  
 (liq.-crystal; metastable states in antiferroelec. liq. crystals)  
 IT Antiferroelectric materials  
 Dielectric constant  
 Ferroelectric transition  
 Metastable state (energy level)  
 (metastable states in antiferroelec. liq. crystals)  
 IT 64-17-5, Ethanol, properties  
 RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation,  
 nonpreparative)  
 (metastable states in antiferroelec. liq. crystals)  
 IT 294660-41-6  
 RL: PRP (Properties)  
 (metastable states in antiferroelec. liq. crystals)  
 RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Adamski, P; Liquid crystals 1989, P104  
 (2) de Vries, A; Mol Cryst Liq Cryst 1979, V49, P143 CAPLUS  
 (3) Fukuda, A; J Mater Chem 1994, V4, P997 CAPLUS  
 (4) Gauza, K; Mol Cryst Liq Cryst in press 1999  
 (5) Goc, W; Proc SPIE in press 1999  
 (6) Goc, W; Proc SPIE in press 1999  
 (7) Kuczynski, R; Proc SPIE in press 1999  
 (8) Rudquist, P; Mater Chem 1999, V9, P1257 CAPLUS  
 (9) Seomun, S; Mol Cryst Liq Cryst 1997, V303, P181 CAPLUS  
 (10) Takatoh, K; Application of (A) FLC Materials to AM-LCDs Conference  
 summaries 1997  
 IT 294660-41-6  
 RL: PRP (Properties)  
 (metastable states in antiferroelec. liq. crystals)  
 RN 294660-41-6 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-(3,3,4,4,5,5,6,6,7,7,8,8,8-  
 tridecafluorooctyl)-, 4-[[[(1-methylheptyl)oxy]carbonyl]phenyl ester (9CI)  
 (CA INDEX NAME)

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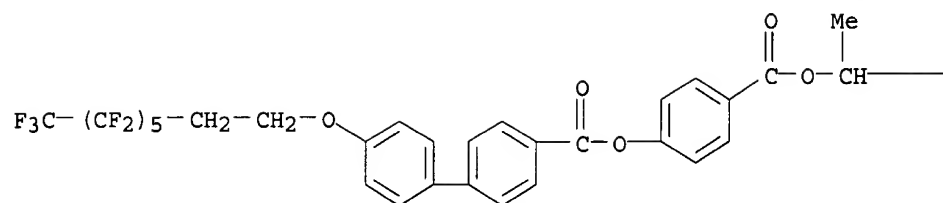


PAGE 1-B

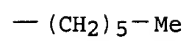


AN 2000:417718 CAPLUS  
 DN 133:258546  
 TI Electro-optical properties of mixtures with the induced antiferroelectric phase  
 AU Kuczynski, Wojciech; Dabrowski, Roman S.; Gauza, S.; Goc, F.; Hoffmann, Jerzy; Czuprynski, Krzysztof L.; Drzewinski, J.; Kenig, K.  
 CS Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Pol.  
 SO Proceedings of SPIE-The International Society for Optical Engineering (2000), 4147(Liquid Crystals), 79-83  
 CODEN: PSISDG; ISSN: 0277-786X  
 PB SPIE-The International Society for Optical Engineering  
 DT Journal  
 LA English  
 CC 73-2 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)  
 Section cross-reference(s): 75, 76  
 AB In some mixts. composed of ferroelec. components the induced antiferroelec. phase was obsd. Two mixts. of this kind, both exhibiting antiferroelec. order in a broad concn. range, were studied. The effect of elec. field of various strengths on optical properties of these mixts. was studied. In small elec. fields the modulation of light intensity occurred, which amplitude in ferroelec. phase was much higher than in the antiferroelec. one. In mixts. with induced antiferroelec. phase the authors detected a large hysteresis of the transition temp. between ferroelec. and antiferroelec. states. In high elec. fields threshold-less switching was obsd. in the hysteresis range. The presence of the thermal hysteresis of the CA\* - C\* phase transition can be considered as a mark of the V-shaped switching. In bulk samples the C\* phase is stable in, this temp. region, where the V-shaped switching was obsd. in thin samples.  
 ST electrooptical property antiferroelec phase smectic liq crystal  
 IT Electrooptical effect  
 Ferroelectric transition  
 (electro-optical properties of mixts. with induced antiferroelec. phase)  
 IT Ferroelectricity  
 (phase; electro-optical properties of mixts. with induced antiferroelec. phase)  
 IT Liquid crystals  
 (smectic; electro-optical properties of mixts. with induced antiferroelec. phase)  
 IT 109204-50-4 215929-80-9 294867-45-1 294867-57-5  
 RL: PRP (Properties)  
 (electro-optical properties of mixts. with induced antiferroelec. phase)  
 RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Chandani, A; Liq Cryst 1999, V26(2), P167 CAPLUS  
 (2) Gauza, S; Mol Cryst Liq Cryst, (in press) 1999  
 (3) Goc, F; Proc SPIE, (in press) 1999  
 (4) Lagerwall, S; Proc 7-th International Conf on Ferroelectric Liquid Crystals 1999, P100  
 IT 215929-80-9  
 RL: PRP (Properties)  
 (electro-optical properties of mixts. with induced antiferroelec. phase)  
 RN 215929-80-9 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

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PAGE 1-B

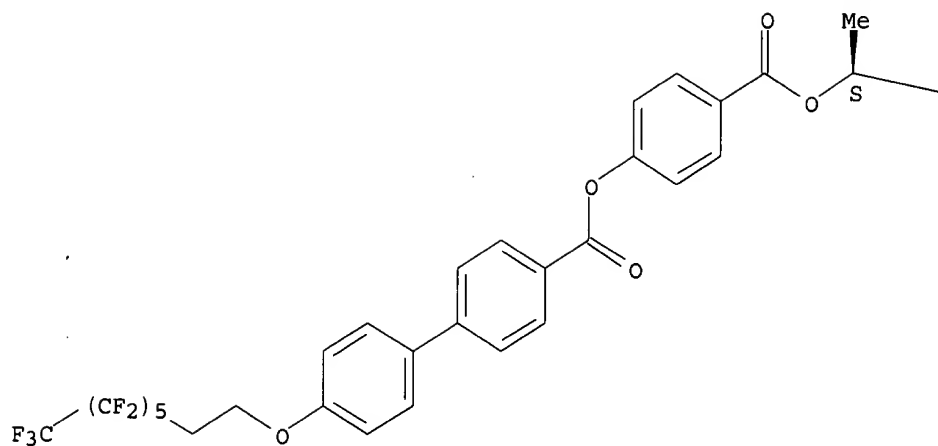


AN 2000:417726 CAPLUS  
 DN 133:259633  
 TI Physical properties of components of mixture with induced SmCA\* phase  
 AU Rutkowska, Jolanta; Perkowski, Pawel; Kedzierski, Jerzy; Raszewski, Zbigniew; Dabrowski, Roman S.; Gauza, S.; Czuprynski, Krzysztof L.; Miszczyk, Emilia  
 CS Inst. Appl. Phys., Military Univ. of Technology, Warszaw, Pol.  
 SO Proceedings of SPIE-The International Society for Optical Engineering (2000), 4147(Liquid Crystals), 101-108  
 CODEN: PSISDG; ISSN: 0277-786X  
 PB SPIE-The International Society for Optical Engineering  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 25, 76  
 AB The aim of the authors' work was the studying of compds. not having SmCA phase, but in their mixts. for some concn. ranges induced smectic SmCA was obsd. Phys. macroscopic properties such as temp. dependencies of the spontaneous polarization PS, the tilt angle .theta. and the elec. permittivity .epsilon..perp. were measured for three compds. and their mixt. The studied mixt. exhibited antiferroelec. order in a broad concn. range. The large thermal hysteresis of the transition between ferroelec. and antiferroelec. phases for this mixt. was demonstrated using dielec. method. The authors have tried to explain the origin of the induced SmCA phase from the mol. structure of mols. of studied compds. obtained from theor. study by using semi-empirical quantum mech. calcns. method MINDO/3.  
 ST phys property component mixt smectic liq crystal  
 IT Antiferroelectricity  
 Dielectric constant  
 Ferroelectric transition  
 (ferroelec. and dielec. permittivity and thermal hysteresis of components of mixt. with induced SmCA\* liq. crystal phase)  
 IT Liquid crystals  
 Liquid crystals  
 (ferroelec.; ferroelec. and dielec. permittivity and thermal hysteresis of components of mixt. with induced SmCA\* liq. crystal phase)  
 IT Ferroelectric materials  
 Ferroelectric materials  
 (liq.-crystal; ferroelec. and dielec. permittivity and thermal hysteresis of components of mixt. with induced SmCA\* liq. crystal phase)  
 IT 250130-33-7 250130-34-8 294874-95-6  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (ferroelec. and dielec. permittivity and thermal hysteresis of components of mixt. with induced SmCA\* liq. crystal phase)  
 RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Gauza, S; Mol Cryst Liq Cryst in press 1999  
 (2) Goc, F; Metastable states in antiferroelectric liquid crystals  
 (3) Hguyen, H; Liq Cryst 1999, V26, P1  
 (4) Kuczynski, W; Electrooptical properties of mixtures with the induced antiferroelectric phase  
 (5) Sarmiento, S; Liq Cryst 1998, V25, P375 CAPLUS  
 IT 250130-33-7  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (ferroelec. and dielec. permittivity and thermal hysteresis of components of mixt. with induced SmCA\* liq. crystal phase)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

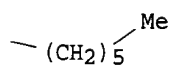


Absolute stereochemistry.

PAGE 1-A



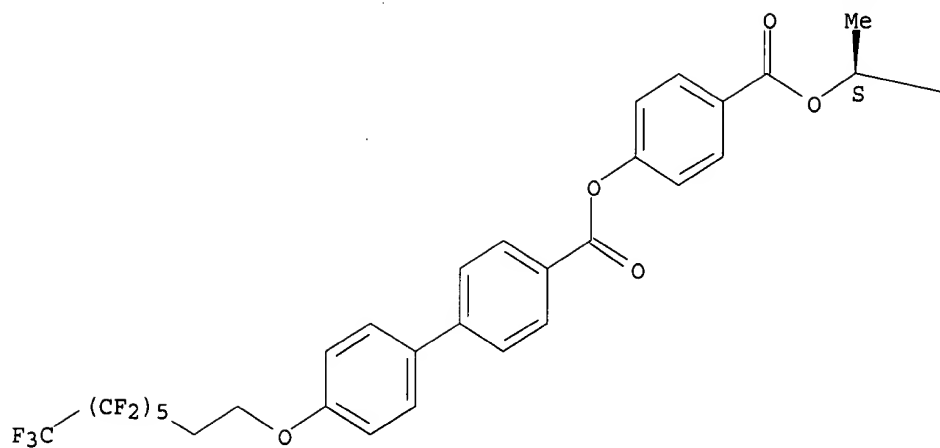
PAGE 1-B



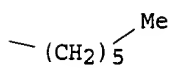
AN 2000:702350 CAPLUS  
 DN 133:357531  
 TI The effect of confinements on phase behavior of the mixture possessing smectic CA phase  
 AU Lapanik, V. A.; Muravski, A. A.; Yakovenko, S. Ye.; Drzewinski, W.; Czuprynski, K.; Dabrowski, R.  
 CS Institute of Applied Physics Problems, Minsk, 220064, Belarus  
 SO Ferroelectrics (2000), 244(1-4), 129-135  
 CODEN: FEROA8; ISSN: 0015-0193  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 74, 76  
 AB The authors present exptl. data on the phase behavior of a mixt. possessing SmCA\* phase, which show that the balance between ferroelec. and antiferroelec. states is very mobile and can be shifted in favor of ferroelec. phase by weak external forces due to aligning surfaces.  
 ST confinement phase behavior smectic liq crystal mixt  
 IT Ferroelectric materials  
 (effect of confinements on phase behavior of mixt. possessing smectic CA phase)  
 IT Electrooptical effect  
 (of liq. crystal mixt. possessing smectic CA phase)  
 IT Liquid crystals  
 (smectic, ferroelec.; effect of confinements on phase behavior of mixt. possessing smectic CA phase)  
 IT Liquid crystals  
 (transitions; effect of confinements on phase behavior of mixt. possessing smectic CA phase)  
 IT 205435-21-8 250130-33-7 250130-34-8 294665-20-6  
 294665-22-8 305811-65-8  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (effect of confinements on phase behavior of mixt. possessing smectic CA phase)  
 RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Bahr, D; Phys Rev Lett 1993, V70, P1842  
 (2) Drzewinski, W; Mol Cryst Liq Cryst in press 1999  
 (3) Fukuda, A; J Mater Chem 1994, V4, P997 CAPLUS  
 (4) Fukuda, A; Mol Cryst Liq Cryst 1997, V303, P379 CAPLUS  
 (5) Inui, S; J Mater Sci 1996, V6, P671 CAPLUS  
 (6) Izosaki, T; Phys Rev B 1993, V48, P13439  
 (7) Lagerwall, S; Proc Int Disp Res Conf Eurodisplay 1999, P1140  
 (8) Miyasato, K; Jap J Appl Phys 1983, V22, PL661  
 (9) Pikin, S; Jap J Appl Phys 1981, V20, PL557 CAPLUS  
 IT 250130-33-7  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (effect of confinements on phase behavior of mixt. possessing smectic CA phase)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



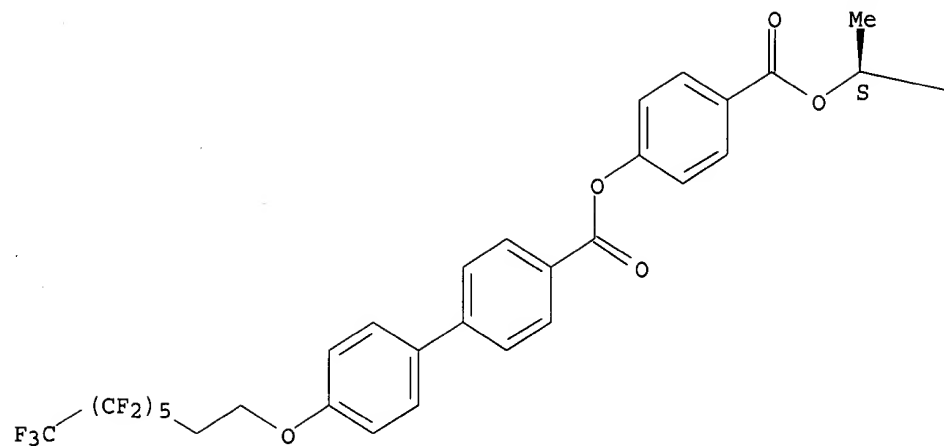
PAGE 1-B



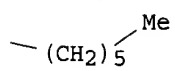
AN 2000:844340 CAPLUS  
 DN 134:93642  
 TI Antiferroelectric liquid crystals with fluorinated parts of terminal chains. III. Investigation of smectic layer spacing by x-ray scattering methods  
 AU Przedmojski, Jan; Dabrowski, Roman; Czuprynski, Krzysztof; Drzewinski, Witold  
 CS Inst. Fiz. Politech., Warsaw, 00-665, Pol.  
 SO Biuletyn Wojskowej Akademii Technicznej (2000), 49(8), 19-41  
 CODEN: BWATFP; ISSN: 1234-5865  
 PB Wojskowa Akademia Techniczna  
 DT Journal  
 LA Polish  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 25  
 AB Changes of smectic layer spacing, the intensity of the diffraction peaks and its half width upon temp. were measured for recently prepd. benzoic acid deriv. esters having antiferroelec. smectic CA\* phase. The presence of a fluorinated fragment in the terminal chain of mols. involves shortening of the SmCA\* smectic layer spacing and increasing the tilt in the layers of SmCA\* phase esp. for the compds. with short tails.  
 ST fluorinated antiferroelec liq crystal smectic layer spacing  
 IT Liquid crystals  
 (antiferroelec.; investigation of smectic layer spacing by x-ray scattering methods in esters contg. fluorinated terminal chains)  
 IT Antiferroelectric materials  
 (liq.-crystal; investigation of smectic layer spacing by x-ray scattering methods in esters contg. fluorinated terminal chains)  
 IT 250130-33-7 250130-34-8 317807-25-3 317807-27-5  
 317807-29-7 317807-31-1 317807-33-3 317807-35-5 317807-37-7  
 317807-40-2 317807-43-5 317807-46-8 317807-49-1 317807-52-6  
 317807-55-9 317807-58-2 317807-61-7 317807-64-0 317807-67-3  
 317807-69-5 317807-72-0  
 RL: PRP (Properties)  
 (investigation of smectic layer spacing by x-ray scattering methods in esters contg. fluorinated terminal chains)  
 IT 250130-33-7  
 RL: PRP (Properties)  
 (investigation of smectic layer spacing by x-ray scattering methods in esters contg. fluorinated terminal chains)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



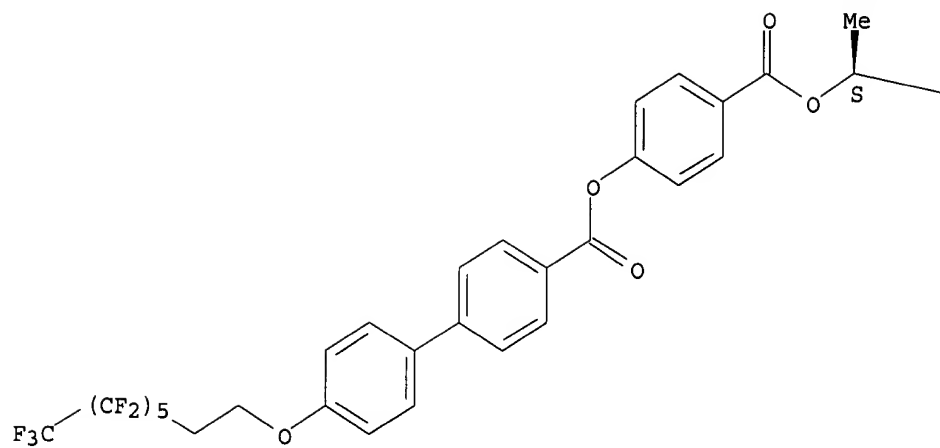
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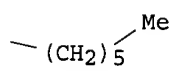
AN 2001:186900 CAPLUS  
 DN 134:303319  
 TI Bicomponent systems with induced or enhanced antiferroelectric SmCA\* phase  
 AU Gauza, S.; Czuprynski, K.; Dabrowski, R.; Kenig, K.; Kuczynski, W.; Goc, F.  
 CS Military University of Technology, Warsaw, 00-908, Pol.  
 SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (2000), 351, 287-296  
 CODEN: MCLCE9; ISSN: 1058-725X  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 74, 76  
 AB A new method of the formulation of liq. cryst. antiferroelec. (CA\*) materials from smectic C\* and smectic A components is demonstrated. The phase diagrams of the induced CA\* systems and the temp. dependence of their smectic layer spacings and switching behavior are shown.  
 ST antiferroelec smectic phase induced enhanced bicomponent system; switching antiferroelec ferroelec bicomponent system induced enhanced antiferroelec phase  
 IT Antiferroelectricity  
 Ferroelectric switching  
 (antiferroelec.-ferroelec. switching in bicomponent systems with induced or enhanced antiferroelec. SmCA\* phase)  
 IT Liquid crystals  
 (chiral smectic CA, antiferroelec.; bicomponent systems with induced or enhanced)  
 IT Phase diagram  
 (of bicomponent systems with induced or enhanced antiferroelec. SmCA\* phase)  
 IT 112901-67-4 205435-21-8 215929-83-2 215929-85-4 215929-87-6  
 215929-88-7 250130-29-1 **250130-33-7** 250130-34-8  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (bicomponent systems with induced or enhanced antiferroelec. SmCA\* phase)  
 RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Brodzik, M; Liq Cryst 1995, V18, P61 CAPLUS  
 (2) Brodzik, M; Liq Cryst 1996, V20, P99 CAPLUS  
 (3) Chandanii, A; Jpn J Appl Phys 1989, V28, PL1261  
 (4) Dabrowski, R; Modern Topics in Liquid Crystals Induced Smectic and Nematic Phases and Reentrant Phenomena 1993, P125  
 (5) Drzewinski, W; Mol Cryst Liq Cryst in press 1999  
 (6) Fukuda, A; J Mat Chem 1994, V4, P997 CAPLUS  
 (7) Fukuda, A; Proc of Asia Display 1995, P61  
 (8) Goc, F; Proc SPIE in press 1999  
 (9) Gorecka, E; Phys Rev Lett 1998, V81, P2946 CAPLUS  
 (10) Matsumoto, T; Liq Cryst Today 1998, V8(4), P6  
 (11) Seomun, S; Jpn J Appl Phys 1997, V36, P3586 CAPLUS  
 IT **250130-33-7**  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (bicomponent systems with induced or enhanced antiferroelec. SmCA\* phase)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



PAGE 1-B



AN 2001:811609 CAPLUS  
 DN 136:93736  
 TI Bicomponent system with induced antiferroelectric SmCA\* phase  
 AU Gauza, Sebastian; Czuprynski, Krzysztof; Dabrowski, Roman; Kuczynski, Wojciech; Pocięcha, Damian  
 CS Military University of Technology, Warsaw, 00-908, Pol.  
 SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (2001), 365, 189-198  
 CODEN: MCLCE9; ISSN: 1058-725X  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 75-11 (Crystallography and Liquid Crystals)  
 Section cross-reference(s): 73, 74, 76  
 AB In mixt. of two ferroelec. compds.: 4-(1-methyloctyloxycarbonyl)phenyl 4'-octyloxybiphenyl-4-carboxylate and 4-(1-methylheptyloxycarbonyl)phenyl 4-(perfluorohexyl-2-ethoxy)biphenyl-4-carboxylate an antiferroelec. SmCA\* phase was induced. Dielec. and electrooptic properties were studied and discussed. V-shaped switching was obsd. in this mixt.  
 ST ferroelec component phase diagram antiferroelec induced phase  
 IT Liquid crystals  
 (antiferroelec.; ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 IT Liquid crystals  
 (ferroelec.; ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 IT Antiferroelectric materials  
 Ferroelectric materials  
 (liq.-crystal; ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 IT Dielectric constant  
 Phase diagram  
 (of ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 IT Electrooptical effect  
 (switching; of ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 IT 114865-61-1, 4-(1-Methyloctyloxycarbonyl)phenyl 4'-octyloxybiphenyl-4-carboxylate 215929-80-9, 4-(1-Methylheptyloxycarbonyl)phenyl 4-(perfluorohexyl-2-ethoxy)biphenyl-4-carboxylate  
 RL: PRP (Properties); PRP (Properties)  
 (ferroelec. component (methyloctyloxycarbonyl)phenyl octyloxybiphenylcarboxylate-(methylheptyloxycarbonyl)phenyl (perfluorohexylethoxy)biphenylcarboxylate system with induced antiferroelec. SmCA\* phase)  
 RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Gauza, S; Mol Cryst Liq Cryst in press 2000  
 (2) Goc, F; Proc SPIE in press 1999  
 (3) Matsumoto, T; J Mat Chem 1999, V9, P2051  
 (4) Reikernad, T; Liq Cryst 1994, V17, P681  
 (5) Rudquist, P; SID, DIGEST 1999, P409  
 IT 215929-80-9, 4-(1-Methylheptyloxycarbonyl)phenyl 4-(perfluorohexyl-2-ethoxy)biphenyl-4-carboxylate



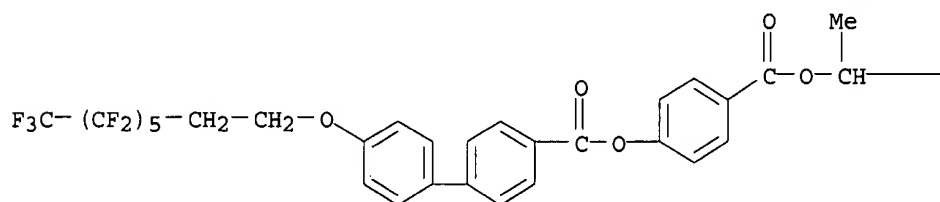
RL: PRP (Properties); PRP (Properties)

(ferroelec. component (methyloctyloxy carbonyl)phenyl  
octyloxybiphenylcarboxylate-(methylheptyloxy carbonyl)phenyl  
(perfluorohexylethoxy)biphenylcarboxylate system with induced  
antiferroelec. SmCA\* phase)

RN 215929-80-9 CAPLUS

CN [1,1'-Biphenyl]-4-carboxylic acid, 4'--[(3,3,4,4,5,5,6,6,7,7,8,8,8-  
tridecafluorooctyl)oxy]-, 4-[[[(1-methylheptyl)oxy]carbonyl]phenyl ester  
(9CI) (CA INDEX NAME)

PAGE 1-A



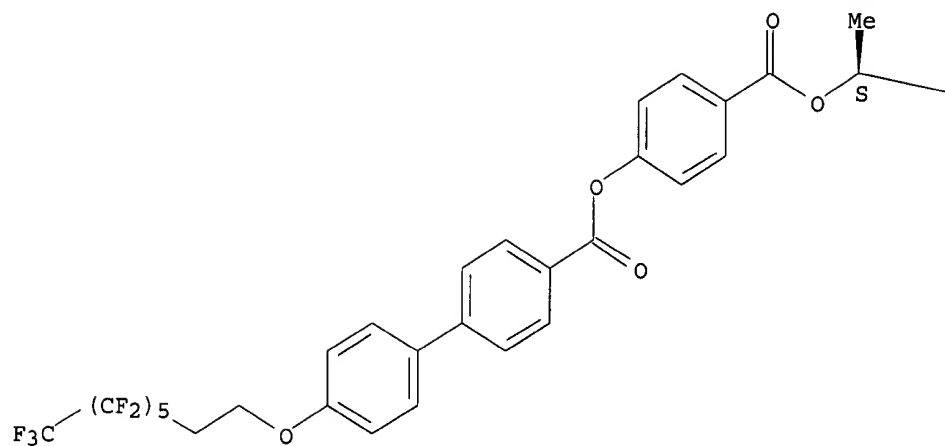
PAGE 1-B

—  $(\text{CH}_2)_5-\text{Me}$

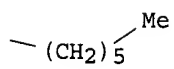
AN 2001:815458 CAPLUS  
 DN 136:78027  
 TI Properties of system with induced SmCA\* phase  
 AU Rutkowska, J.; Kedzierski, J.; Raszewski, Z.; Perkowski, P.; Dabrowski, R.; Czuprynski, K.; Gauza, S.  
 CS Institute of Applied Physics, MUT, Warsaw, 00-908, Pol.  
 SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (2001), 366, 617-628  
 CODEN: MCLCE9; ISSN: 1058-725X  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 76-9 (Electric Phenomena)  
 Section cross-reference(s): 75  
 AB Phys. macroscopic properties such as the spontaneous polarization Ps, the tilt angle .theta., dielec. permittivity .epsilon. as a function of temp. were measured for system with induced SmCA\* composed simultaneously of three ring chiral esters with partially fluorinated terminal chain and nonfluorinated. Dielec. and spontaneous polarization measurements on heating and cooling runs show a thermal hysteresis for the phase transition between SmC\* and SmCA\* phases.  
 ST ferroelec liq crystal mixt dielec property  
 IT Liquid crystals  
 (ferroelec., smectic; properties of system with induced SmCA\* phase)  
 IT Ferroelectric materials  
 (liq.-crystal, smectic; properties of system with induced SmCA\* phase)  
 IT Dielectric constant  
 Dielectric relaxation  
 Hysteresis  
 Molecular orientation  
 Phase transition  
 Spontaneous dielectric polarization  
 (properties of system with induced SmCA\* phase)  
 IT 112901-67-4 250130-33-7 250130-34-8  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
 (properties of system with induced SmCA\* phase)  
 RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Bourny, V; Liq Cryst 2000, V27, P559 CAPLUS  
 (2) Gauza, S; Mol Cryst Liq Cryst (be printed) 2000  
 (3) Goc, F; Proceedings of SPIE 2000, V4147, P75 CAPLUS  
 (4) Hguyen, H; Liq Cryst 1999, V26, P1  
 (5) Hiraoka, K; Jpn J Appl Phys 1990, V29, P103  
 (6) Kuczynski, W; Proceedings of SPIE 2000, V4147, P79 CAPLUS  
 (7) Rutkowska, J; Proceedings of SPIE 2000, V4147, P101 CAPLUS  
 (8) Sarmiento, S; Liq Cryst 1999, V25, P375  
 IT 250130-33-7  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
 (properties of system with induced SmCA\* phase)  
 RN 250130-33-7 CAPLUS  
 CN [1,1'-Biphenyl]-4-carboxylic acid, 4'-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)oxy]-, 4-[[[(1S)-1-methylheptyl]oxy]carbonyl]phenyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



PAGE 1-B



AN 2001:815475 CAPLUS  
 DN 136:77991  
 TI Kinetics of the transition between ferroelectric and antiferroelectric states in liquid-crystalline mixtures  
 AU Kuczynski, W.; Goc, F.; Dabrowski, R.  
 CS Institute of Molecular Physics, Polish Academy of Sciences, Poznan, 60-179, Pol.  
 SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (2001), 366, 771-784  
 CODEN: MCLCE9; ISSN: 1058-725X  
 PB Gordon & Breach Science Publishers  
 DT Journal  
 LA English  
 CC 76-8 (Electric Phenomena)  
 Section cross-reference(s): 75  
 AB Studies of a mixt. with induced antiferroelec. phase are described. This mixt. exhibits large thermal hysteresis of the transition between ferroelec. and antiferroelec. phases, which was demonstrated using dielec. and optical methods. The kinetics of the transition from the ferroelec. to the antiferroelec. state was extremely slow - its time const. ranged from few minutes to many hours, depending on temp. The rate of transition formally obeys the Avrami equation describing the kinetics of phase transitions from a supercooled state. However, the remarkably small exponent suggests, that the Avrami model is not suitable for description of the studied transition. The coexistence of ferroelec. and antiferroelec. states was noticed in a broad temp. range. In the same range the V-shaped switching was obsd. The obsd. phenomena: hysteresis, slow kinetics and threshold-less switching are probably caused by competition of ferroelec. and antiferroelec. interactions acting between smectic layers.  
 ST liq crystal mixt ferroelec antiferroelec transition  
 IT Dielectric constant  
 Dielectric hysteresis  
 Ferroelectric transition  
 Ferroelectricity  
 Liquid crystals  
 Phase transition  
 (kinetics of the transition between ferroelec. and antiferroelec. states in liq.-cryst. mixts.)  
 IT Antiferroelectricity  
 (transition; kinetics of the transition between ferroelec. and antiferroelec. states in liq.-cryst. mixts.)  
 IT 294660-41-6 385416-74-0  
 RL: PRP (Properties)  
 (kinetics of the transition between ferroelec. and antiferroelec. states in liq.-cryst. mixts.)  
 RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE  
 (1) Avrami, M; J Chem Phys 1940, V8, P212 CAPLUS  
 (2) de Vries, A; Mol Cryst Liq Cryst 1979, V49, P143 CAPLUS  
 (3) Fukuda, A; J Mater Chem 1994, V4, P997 CAPLUS  
 (4) Gauza, S; Mol Cryst Liq Cryst, in press  
 (5) Goc, F; Proc SPIE (Int Soc Opt Eng) 1999, V4017, P171 CAPLUS  
 (6) Goc, F; Proc SPIE (Int Soc Opt Eng) 1999, V4017, P75  
 (7) Gorecka, E; Phys Rev Lett 1998, V81(14), P2946 CAPLUS  
 (8) Kuczynski, W; Proc SPIE (Int Soc Opt Eng) 2000, V4147, P79 CAPLUS  
 (9) Rudquist, P; Mater Chem 1999, V9, P1257 CAPLUS  
 (10) Seomun, S; Mol Cryst Liq Cryst 1997, V303, P181 CAPLUS  
 (11) Takatoh, K; Proc 6-th Int Conf on Ferroelectric Liquid Crystals 1997, P18  
 IT 294660-41-6  
 RL: PRP (Properties)  
 (kinetics of the transition between ferroelec. and antiferroelec. states in liq.-cryst. mixts.)  
 RN 294660-41-6 CAPLUS

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$$-(\text{CH}_2)_5-\text{Me}$$

## WEST



Generate Collection

L1: Entry 4 of 6

File: DWPI

May 7, 1996

DERWENT-ACC-NO: 1996-272919

DERWENT-WEEK: 199628

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TITLE: LC properties improver - gives improved memory margin when used in anti-ferroelectric LC compsns.

PRIORITY-DATA: 1994JP-0277113 (October 17, 1994)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<u>JP 08113784 A</u>	May 7, 1996		007	C09K019/54

INT-CL (IPC): C09 K 19/54; G02 F 1/13; G02 F 1/137

ABSTRACTED-PUB-NO: JP08113784A

## BASIC-ABSTRACT:

An improver for LC properties comprises a cpd. of formula (I); where m = 1-14; n = 0-13; X = single bond, O, COO or OCO; r = 1 or 2; p = 2-12; and Z = CH3 or CF3.

USE - (I) are useful for improving LC properties esp. of anti-ferroelectric LC(s).

ADVANTAGE - (I) can give LC compsns. with a much improved memory margin capable of being sufficiently used in displays, esp. anti-ferroelectric ones.

**WEST**

Generate Collection

L1: Entry 3 of 6

File: JPAB

Mar 26, 1996

PUB-NO: JP408082778A

DOCUMENT-IDENTIFIER: JP 08082778 A

TITLE: ANTIFERROELECTRIC LIQUID CRYSTAL COMPOSITION

PUBN-DATE: March 26, 1996

## INVENTOR-INFORMATION:

NAME

COUNTRY

OKABE, NOBUHIRO

HASHIMOTO, SHIGEJI

ISOZAKI, TADAAKI

HAGIWARA, TAKASHI

SUZUKI, GIICHI

KAWAMURA, ICHIRO

INT-CL (IPC): G02 F 1/13; C09 K 19/20; C09 K 19/30; C09 K 19/32; C09 K 19/34; C09 K 19/42; C09 K 19/44; C09 K 19/46

## ABSTRACT:

PURPOSE: To improve the threshold voltage, response time and gradual and lingering rate of an antiferroelectric liquid crystal compsn. by incorporating at least two kinds of antiferroelectric liquid crystal compds.

CONSTITUTION: The compsn. contains at least two kinds of antiferroelectric liquid crystal compds. (a), or at least one kind of antiferroelectric liquid crystal compd. (a) and at least one kind of ferroelectric liquid crystal compd. (b). Or, an improving agent (c) for liquid crystal characteristics is further added to the antiferroelectric liquid crystal compsn. The mixture of antiferroelectric liquid crystal compds. (a) is obtd., for example, by mixing CF<sub>3</sub> antiferroelectric liquid crystal compds., CH<sub>3</sub> antiferroelectric liquid crystal compds., or a CF<sub>3</sub> antiferroelectric liquid crystal compd. and a CH<sub>3</sub> antiferroelectric liquid crystal compd. The mixture is obtd. by mixing two or more, to the degree of about twenty, kinds of compds. Further, an improving agent for liquid crystal characteristics may be added to various kinds of antiferroelectric liquid crystal compds.

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# WEST



Generate Collection

L1: Entry 5 of 6

File: DWPI

Mar 26, 1996

DERWENT-ACC-NO: 1996-218383  
 DERWENT-WEEK: 199622  
 COPYRIGHT 2002 DERWENT INFORMATION LTD

TITLE: Antiferroelectric liquid crystal compsn. - having improved threshold voltage, response time and wide temp. operation range

PRIORITY-DATA: 1994JP-0243320 (September 12, 1994)

## PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 08082778 A	March 26, 1996		080	G02F001/13

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ABSTRACTED-PUB-NO: JP08082778A  
 BASIC-ABSTRACT:

An antiferroelectric liq.-crystal compsn. contains (A) (a) at least two antiferroelectric liq.-crystal cpds. of formula A-skeleton structure-D (I), or (B) (a) one or more antiferroelectric liq.-crystal cpd(s). of formula (I), and (b) one or more ferroelectric liq.-crystal of formula A-basic skeleton-Q (III). In addition, an agent for improving liq.-crystal characteristics is present in (A) or (B).

In the formulae, A = R-, RO-, RCOO-, and RCO-, or R3-O-R4 and R5-CH=CH-R6; R = 2-20C alkyl gp.; when A = R-, part of H in the alkyl gp. may be substituted by halogen; R3 = 1-8C n-alkyl gp.; R4 = a 1-10C n-alkylene gp.; R5 = H, or a 1-5C straight-, or branched-chain alkyl gp.; R6 = a 2-14C straight-, or branched-chain alkyl gp.; D = a gp. selected from -COOCH\*(E)-G, -COOCH\*(E)-Ph, -(CH2)2COOCH\*(E)-G, -(CH2)2COOCH\*(E)-Ph, -COO(CH2)2-CH\*(E)-G or -COO(CH2)2-CH\*(E)-Ph (II); E = a gp. selected from -CF3, -C2F5, -C3F7, CClF2, CH3, and C2H5; asterisk = asymmetric carbon; G = a 2-20C straight-, or branched-chain alkyl gp.; branched portion = a methyl gp.; a carbon-carbon double bond may be contained in part of the straight chain alkyl; Ph = a gp. selected from -C6H5, -p-C6H4-, -C6H11 or -C6H10-lower alkyl; skeleton structure = a gp. selected from e.g. -(p-C6H4)-COO-(p-C6H4)-, -(p-C6H4)-COO-(p-C6H4)-(p-C6H4)-, -(p-C6H4)-(p-C6H4)-COO-(p-C6H4)-, -(p-C6H4)-COO-(p-C6H4)-COO-(p-C6H4)-, -(p-C6H4)-(p-C6H4)-COO-(p-C6H4)-(p-C6H4)- or -(p-C6H4)-COO-(p-C6H4)-COO-(p-C6H4)-COO-(p-C6H4)- (4).

The ferroelectric liq.-crystal cpd. is a cpd. of formula (III) (where A = as formula (I); Q = a gp. selected from formulae -COOCH\*(CF3)R1, or -COO(CH2)nCOOCH\*(CH3)R (46) (12 claimed) and -CH\*(CH3)-(CH2)n-CH\*(CH3)O R or -Cyclopropyl-R (47) (4 claimed); R1 = 1-20C alkyl gp.; n = 1-4; basic skeleton = -(p-C6H4)-COO-(p-C6H4)- or -(p-C6H4)-COO-(p-C6H4)-C OO-(m-C6H4)- (48) (8 claimed) and -(p-C6H4)-(p-C6H4)-COO-(p-naphthyl)- or -(p-C6H4)-(p-C6H4)-OCH2-(p-C6H4)- (49) (7 claimed).

The agent for improving the liq.-crystal characteristics comprises a non-chiral cpd. selected from cpds. of formula (IIIA) formula (IV), (V), and R10COOR11(VI). In the formulae, n = 1-3; X and Y = -, O, COO, or OCO; h = H, or F; M = H, yet branched portion may be F1 p = 2-12 (including branched chain); m = 1 or 2. n = 4-14; X, and Y = -, O, COO, or OCO; m = 4-14. n = 4-14; X and Y = -, O, COO, or OCO; m = 0-13; p = 1-14; R10 and R11 = 1-20C alkyl gps. opt. halogen substd..

USE - The antiferroelectric liq.-crystal compsn. is used for liq.-crystal display



device.

ADVANTAGE - The antiferroelectric liq.-crystal compsn. had dramatically improved threshold value voltage, response time. The use of the agent for improving the liq.-crystal characteristics further improves the threshold value voltage time. The antiferroelectric liq.-crystal compsn. has wide temp. operation range for liq.-crystal display device.